


## An account of a Botanical Expedition to Lower Siam.



It had long been clear that there was a very great difference between the flora of the Northern part of the Peninsula South of Burmah, and that of the southern portion from Penang southwards, and it was in order to discover where the boundary line between these two floras lay that I started from Penang on the 23rd of February, 1910, for Alor Sta by the little steamer Liuchiu. The boat started at 8 o'clock a.m. and arrived at the town of Alor Sta at 2 p.m. Off the island Pulau Bidan I noticed that the sea was for some distance of a bright green colour due to the immense abundance of a minute green alga floating on the surface. The coast of Kedah, where the river enters the sea, is extremely flat and low lying, the Elephant hill, Gunong Geriang, and another one standing out on the flat plain very conspicuously. The shores were covered with immense quantity of *Avicennia* bushes and trees. *Avicennia officinalis* usually occurs mixed up with the true mangroves *Rhizophoracnae* but where there is a demand for firewood for steamers etc., unless protected the mangroves are cut away so largely for firewood, piles and for fishing stakes, that the valueless *Avicennia* often remains alone. Its wood is not of use as firing and it seems to be considered valueless for posts or stakes. A similar extensive area of *Avicennia* to the exclusion of the *Rhizophoraceae* is to be seen at Prai in Province Wellesley where the demand for mangrove firewood has left the mud banks in possession of the despised *avicennia*. The boat stopped a short time at a village at the mouth of the river and then proceeded to the town an hours'

steam up river. The river banks were fringed with the ordinary tidal river plants, among which the Nipah palm and the Korma or tidal river date palm (*Phoenix paludosa*) were conspicuous. This palm grows along the banks of all the tidal rivers here in small patches. It occurs in such spots from Bengal, as far south as Lumut in the Dindings, and in Upper Siam and Cochin-China, but is absent from the tidal rivers of the south of the Peninsula.

A moderately large crocodile was lying on the mud of the river bank as we passed up but speedily disappeared into the water.

The town and suburbs of Alor Sta are well kept and picturesque, the houses and gardens being bright and pleasant to see. During my stay Mr. W. G. Maxwell and Mrs. Maxwell kindly entertained me and gave me every facility for pursuing my botanical researches.

Alor Sta lies in an extensive plain of ricefields and it is only in the distance that one can see any hills. Kedah Peak, (Gunong Jerai) and Gunong Perak are the only ones of any size to be seen, though to the North and East low ranges are to be seen on the horizon. After lunch I went with the plant-collector to examine the flora of the rice-fields. The paddy crop was nearly all gathered in, but a few natives were employed in reaping the last patches. Here and there on the edges of the paddy fields, and scattered over them, were isolated clumps of bushes and trees. In these thickets were two species of *Capparis*, thorny shrubs half scandent. One of these had white flowers of medium size with a yellow blotch which turned later of a deep madder pink on the two lower petals (*C. micracantha*); the other had smaller white flowers, (*C. sepiaria*). Both we found later common also at Perlis and Setul. *Coldenia procumbens* is a common weed here, a prostrate creeping half fleshy plant with minute flowers, I have only previously seen it in Pahang near Pekan. Here we also first saw the large fan palm *Corypha* which extends up to Perlis and is a most conspicuous and handsome tree. We succeeded later in gathering fallen fruits of it and saw one or two in flower,



but to get at the flowers one would have to fell the tree, a matter of some difficulty. Like all species of the genus it only produces its flowers when it is full grown at the apex of the tree, and after developing its fruits the whole plant dies. Three species of the genus occur in India and Ceylon, one in the Andamans and one in Borneo. The genus is quite absent from the Peninsula south of Alor Sta.

The weather was bright and extremely hot and many of the rice field-plants parched up and dry. These flat dry pastures in the bright sunlight with the blue hills in the distance, are a great change from the forest clad country of the south of the Peninsula and with the songs of birds, the distant crowing of cocks, and lowing of cattle reminded one more of an autumn scene in England after the harvest is over. The distant hills except Gunong Jerai and Gunong Perak which are granite, are of sandstone, and it is no doubt the denudation of this rock that has made the flat plains of Alor Sta. I was told that this sandy plain runs right across from West to East and there is hardly a hill to be crossed in traversing the Peninsula from here. This and the complete change of flora suggests that at no distant date the lower part of the peninsula, south that is of Kedah Peak, was separated by the sea from the land north of this point and I should be inclined to suggest too that at this time both Gunong Perak and Gunong Jerai were islands. No one seems to have visited Gunong Perak, but I am informed it is also of granite like Gunong Jerai. The flora of Gunong Jerai seems to be in certain respects similar to that of Mount Ophir which is also a detached hill standing away from the main chain of the Perak and Selangor ranges, lying in an alluvial plain of apparently no great antiquity. It is quite unlike the flora of this main range.

The low flat plain country extends really south of Alor Sta as all of Province Wellesley is similarly flat, as far as Bukit Mertajam, and Bukit Juru. The flora here is, however, more like that of the alluvial plains further South. Until however, we have some geological data to go on for this part of the Peninsula it would be unsafe to dogmatize but as be-

fore remarked I would suggest that at no great distance of time the whole of this flat land was covered by the sea in which Gunong Jerai and Gunong Perak stood out as Islands as Penang does at the present day, and that the present flora of Province Wellesley and Gunong Jerai came up from the South, while the flora of the country from Bangtaphan to Alor Sta came from Burmah south-wards.

On the 24th, I and Ahmat the plant collector started early for Gunong Geriang, or Elephant Hill, a large block of limestone some miles from Alor Sta. I presume that the hill takes its name from Eriang, a vulture, these birds being very common at times all over the northern part of the Peninsula. We drove in a gharry about 2 miles to a point on the river, whence we took a boat up stream, a jabor provided kindly for us by Mr. Maxwell. A splendid *Erythrina*, a blaze of red, was seen on the other side of the river. There are two species here obviously native. Most at least of the species recorded as peninsular in the Materials for a flora of the Malay Peninsula are only cultivated plants. A single tree in the Batang Padang valley, Perak is the only specimen of an *Erythrina* which I have seen undoubtedly wild in the peninsula south of Alor Sta. Crossing the river we turned up a tributary which runs from Gunong Geriang and made our way up to a landing place close to the hill base. On both sides of the river and in fact all over the whole district the land is or has been under cultivation, and is covered with rice fields or villages, so that whatever the original indigenous flora was, it is almost all gone now. As we went along in the boat we collected any plant of interest we saw, among these I noted that *Leea rubra* was extremely abundant as a tidal mud plant growing in great abundance. I have never seen it in such a locality before, but it occurs in Singapore in the flat country along the Bukit Timah road, in the Economic garden, which locality was at no very distant date a similar tidal river as is evidenced by abundance of Nipah fruits in a good state of preservation, which are constantly found in digging over the ground and the presence of the tidal mud fern *Acrostichum aureum* too confirms this. I

had supposed before that this pretty tree vine with its coral red flowers had been introduced here as an ornamental plant, but it seems more likely now that it is another relic of the old tidal river of Singapore. The Geriang river had a narrow fringe of trees and shrubs along it where the campongs did not come down to the edge, and on the return journey I was rather surprised in so narrow a ridge to see four or five large K'rah monkeys (*Macacus cynomolgus*), for these animals usually require a considerably larger area of woodland to maintain themselves. The pretty white flowered *Donax arundastrum* was abundant along the edge of the stream as it usually is in our tidal rivers. The stream narrowed till we came to the quarry at the foot of the hill, and as the tide would have fallen ere our return we had to send the boat back to a distant point where there would be enough water when the tide was down. There is a track up the hill over the rocks with small ladders and bridges where necessary, which eventually leads to some caves. There is a way two miles in length we are told through these caves which eventually opens on the sea shore having traversed the whole of the hill. Time did not permit us to go through this, but we saw a party of Malays who were going through. The rocks were very dry and much of the vegetation out of flower. It did not appear to be nearly as rich as the limestone flora of the Batu Caves in Selangor nor as those of Bidi in Sarawak. Possibly in the rainy season more might be found. One of the plants I was anxious to find was the curious Gesneraceous plant *Lepadanthus flexuosus* of which a single specimen had been brought by Mr. Fox from this locality (called Gunong Grenong in the Materials). For some time we were unable to find any in flower, but in the mouth of a big cave I saw a plant high up which much resembled it and seemed to be in flower. After some labour by the aid of a long bamboo we managed to push the plant off its perch and found it was the desired plant in flower and presently discovered that we might have spared ourselves the labour of securing the one plant, as clambering round a corner of the rocks we came upon a great abundance of the plant in fine flower and easy reach.

The plant is a softly hairy herb with rounded light green leaves and is about two feet tall and branched. The flowers have more of the appearance of a scrophularineous plant than of a gesneraceous plant, being more distinctly two lipped, the lobes of the lip are violet and the rest of it is white. It appears to be confined to this hill and is the only known species of its genus. The only other plant of this order was the pretty little *Chirita viola* of which only a few specimens were in flower. Its little blue flowers and large round leaves make it quite pretty. It is abundant and very variable all over the limestone rocks of the region as far north as Setul at least. The small aroid *Hapaline Brownei* was showing its ivory white spathes on the rocks. A species of *Rauwolfia* (*R. perakensis*) a shrub almost leafless with tubular white flowers with a pink centre, was very attractive; we got it also at Setul. Huge trees of *Crypteronia paniculata* grew here entirely leafless but bearing long spikes of small green flowers. Monkeys or some such animals had been breaking off sprays and throwing them down. Otherwise it would have been impossible to get any of it. The green flowered orchid with a veined white lip, *Eulophia Keithii* grew abundantly in clefts of the rocks, its tuberous stems firmly fixed in the cracks. It is abundant all over the limestone rocks of this region. *Koempferia elegans* was just pushing up its leaves. Some of the shrubs and trees were in flower, but probably at a wetter season more of the herbaceous plants would be up, and more of the trees and shrubs in flower. We returned to the foot of the hill and examined the flora of the woody and swampy land at the base, securing many interesting plants. The well known plant *Bryophyllum Calycinum* was extremely abundant and in good flower. It seems to revel in hot dry dusty spots. A native of Africa it has been introduced probably as a curiosity and has run wild in these dry regions and is also very abundant on the sandy heaths at Kwala Pahang. It is well known to lovers of curious plants at home, from the fact that if a leaf is hung up in a damp spot it emits bulbils from all the notches on the edge, and can be thus propagated.

A very fine *mangifera* was in flower near the quarry but but too lofty for us to secure specimens. The Malays called it "Topah" and said the fruit was small but eatable. After lunch we explored the base of the hill along the other side and obtained specimens of the handsome vine *Vitis indica* which occurs all over the limestone hills of this region, but is absent from the Malay Peninsula further South. The glorious scarlet *Erythrinas* were in fine flower and we were able to secure specimens. Having quite filled the two collecting books, we started to return, and walked for two miles across the blazing hot paddy fields to a village, Simpang Ampat, where the boat was waiting. Here we got some "lemonade" at four cents a bottle. This drink was plain aerated water and sugar to judge by its taste; however it was sufficiently refreshing and safer drinking than any water would have been. We returned in the boat and by ricksha to the residency in the afternoon.

Next day, 25th, we drove eight miles in a gharry to Kepala Batas at the head of the Alor Sta rice field valley, in order to investigate the flora of a sandstone hill near there known as Bukit Pinang. The weather was intensely hot. We left the gharry at the police station (having previously telephoned for the luncheon which had been left behind) and walked along the sandy road that led to the quarry at Bukit Pinang. On the way I found a tree of *Heterophragma adenophylla* a tree only recorded previously from Burmah, and as it was in a village compound concluded it must have been planted, though it is not particularly ornamental or useful. Later, however we found it undoubtedly wild in Perlis, and doubtless it was wild in Kedah too. The hill Bukit Pinang was very dry, but wooded with shrubs and trees of no great size. Very abundant was a shrub with tubular white flowers deliciously scented. *Prismatomeris albidiflora* Thw. It is common in dry spots too at Setul. A *Dillenia* almost leafless with very large yellow flowers was very showy. The top of the hill was thickly covered with *Carex indica*, growing as dense as lalang. I have never seen any *Carex* as abundant in one spot in this part of the world. In the dry bed of a stream we found old tracks and

dung of a Tapir, which had probably abandoned this place when the country became too dry. We crossed the hill and descended into a cultivated valley and then returned across the hill at another part and descended again to the village. Bamboos were abundant on this hill, probably *Oxytenanthera nigrociliata*, and in the second spur of the hill was a climbing bamboo like *Bambusa Ridleyi*, but perhaps more definitely scandent, its strong wiry stems were most troublesome to cut or get through. No signs of flowers were to be seen on it.

This hill gave a good idea of the forest flora of these sandstone ridges, and very different from anything I have seen South of the Malay Peninsula. The absence of many of the typical Malay plants was very marked, many genera seemed to have quite disappeared already. There was even a difference in the tidal mud flora, and the plant collector called my attention to the absence of *Octhocharis* so common and conspicuous in all the tidal rivers of the south. The pitcher plants, *Nepenthes* had disappeared and we did not see any all through the trip. Animals were scanty on the hill but we saw the large black and white squirrel, *Ratufa* there. We drove back with an extensive collection of plants in the afternoon. The road was bordered by fine Angsana trees, *Pterocarpus indicus*, which were in full bloom this day, and the native children were loaded with sprays of the fragrant golden blooms. The flowers had begun to fall as we returned and the ground was thickly covered in places with the golden snow of the petals.

(26th) we worked round the rice fields near Alor Sta but got comparatively little, many of the smaller plants having done flowering, but the clumps or islands of trees and bushes dotted over the plain contained samples of what was perhaps the original flora of these plains. In a muddy tidal stream near the residency was a species of *Crinum* which was very different from the ordinary sea shore *Crinum asiaticum*, and was almost identical with the tidal swamp *C. Northianum* of Sarawak. It resembled that species in its long seven foot leaves and the large pearshaped fruit, pointed at the tip, and large seeds, but



the stamens were white and it did not appear to be stoloniferous as in the Borneo plant. I have not seen it elsewhere.

(27) at 7 a.m. we started in three gharries over land to Kanga in Perlis, changing ponies twice at Jutara and Kodian. At the first stopping place I found *Wissadula rostrata*, abundant in the campongs, I had only seen it previously in Pahang, but it is common in Perlis.

The villagers at Jutara had a python of no great size which they were urgent we should buy, but we had no use for it. The whole journey from Alor Sta to Kanga is thirty five miles, and much of the country is picturesque and interesting. At Kodian are four curious block shaped hills of red sandstone arranged in a line, conspicuous from afar across the flat grassy plains. The absence of lalang grass here was striking, the ground being covered with short grasses forming a turf. Among the trees noticed were the grand *Millettia atropurpurea* with its deep purple flowers, and *Cratoxylon formosum* in flower too. On the trees also grew *Dendrobium secundum*, with its showy pink sprays of blossoms, while in the ditches by the roadside were *Nymphaea stellata*, *Utricularia flexuosa* and *Limnanthemum cristatum*. Up to Kodian the roads were very good and the ponies went well, but nearing Kanga the roads were more difficult, probably from a change of soil, for we lost sight of the sandstone hills, and the ponies which had come from Kanga were not as good as those from Kedah. This part of the drive was somewhat uncomfortable and about two miles from Kanga the harness of my pony broke and we had to stop for a few minutes. On getting out to stretch my legs I saw a large tree with rose-pink blossoms close to a cottage, and the plant collector soon got specimens of it. It proved to be a *Xanthophyllum*, (*X. glaucum*) and one of the largest species I had ever seen. We arrived at Kanga about three o'clock and went to the house of Mr. Meadows Frost, who was away at the time, but who returned next day and kindly welcomed me and put me up for the whole of our stay at Perlis. In the evening I started with the plant collector to explore the neighbourhood, and our attention was first attracted by a fine



mass of limestone hill known as Bukit Lagi which was close to the village. It was cut off, however, by a broad river which had to be crossed by a boat near the market place. After crossing we found ourselves in a pasture country, of rather long grass, among which grew a beautiful pale bluish white gentian, *Exacum tetragonum*. This is an Indo-Chinese genus not previously known from the Peninsula, for the species recorded under "Lobb, Singapore" in the Materials were undoubtedly wrongly localized, (Lobbs, collections from Khasiya, Penang and Singapore being mixed in distribution). There were a number of other attractive plants in this pasture, the water-balsam with its large pink flowers (*Hydrocera*) and a beautiful bright blue *Cyanotis* (*C. axillaris*) with succulent red stems, said to be a pest in rice fields in India, but quite absent from the fields of the south of the Peninsula. The little *Hydrolea* with its azure blue starlike flowers was common. We pushed through the wet grass to the foot of Bukit Lagi and collected a number of plants at the base, but had soon to return as the dusk was beginning to fall.

By this time although we had brought a fair number of wire presses for drying the plants, we began to run out of them, as our collections had been very large. We therefore had to look about for material to construct new ones. Formerly I always used presses made of crossed laths of hard wood, but these proved awkward sometimes to carry through thick forest, and I substituted for them the ordinary wire presses of crossed wire, which I contrived to have made sufficiently strong and not too heavy, in fact hardly as heavy as the wooden ones, and more easily portable. In the Telom and Temengo expeditions we found plenty of bamboos which, split into suitable lengths and tied with string or bast from some jungle tree or climber, made suitable presses. At Kanga, bamboo was scarce, the only ones were a few clumps of *Bambusa spinosa* belonging to natives who mostly required the culms for their own buildings and fences, so though we procured a few we had to make shift with anything else we could get that could be used and we found the most suitable things to be the dry leaf

stalks of nipa and coconut palms, the hard outer coat of which split up into laths did very well, though they were not as good as bamboo. The laths were tied together with twine and when that failed some jungle string had to be sought. Rattan split is excellent but often unprocurable and then one has to fall back on the inner bast of Mahangs (*macaranga*) or Bauhinia (Dadaub) or *Gnetum*, *Artocarpus* or the like. It is very seldom that one has to go far in the forests for jungle string. My boy was skilful at making the presses and would often make many while we, I and the plant collector, were out in the woods. The paper we use is Chinese bamboo paper procurable at most of the village shops in the country. Only a few sheets are put in each press which is put out in the sun and taken in on the approach of rain. Most of the plants dry thus in a few days and a week suffices for anything but the very succulent plants such as aroids or orchids. We had, often over sixty presses out drying during this trip and as it was very hot the plants dried well and fast. We had indeed, showers of rain at Perlis every evening, but seldom during the day. The plants when dry were made up into bundles and wrapped in American cloth for travelling, so as to take no injury from damp.

(28th). Taking a Malay man who had no particular work to do, as a guide, Mat and I and he went across the river to ascend Bukit Lagi. We managed to find a way to climb up over the limestone rocks and after much labour got to the top of the ridge. The ridge is about 900 feet high, and though there were many steep precipitous bits, we got up with the aid of lianes without much difficulty. The top we got to was an extremely narrow ridge about two feet wide, the further side being absolutely vertical, and covered with vegetation to the top. Here were *Cycas siamensis*, *Euphorbia antiquorum*, a *Hoya* with pinkish white flowers, a small leaved *Bauhinia* probably *micrantha* out of flower, and a great deal of a species of *Drynaria*. The perished remains of a *Boca* also were seen. It was impossible to progress along the ridge, but there was a rise just beyond which was accessible but so densely covered

with vegetation, chiefly climbers, that we did not attempt it, and redescended the hill. Near the top we found great quantities of cockle-shells in some of the caverns. It is difficult to see how these got here, as it is a long way from the sea. The view from the top is very fine and extensive, a long stretch of rice field and pasture, with large and curiously shaped blocks of limestone dotted about all over it, and a long ridge of limestone hills running from the river at Tebing Tinggi out of sight to the north. It is easy to realize what was undoubtedly the case at no very distant era that the whole of this flat land was under the sea and the strange shaped limestone blocks were islands tenanted by myriads of sea birds.

The descent was more troublesome and risky than the ascent, and in some cases we had to lower ourselves over small precipices with the aid of woody climbers, and I found myself very tired and dry ere I got to the meadows at the foot. On the way up and down the hill we found many plants of interest and beauty, *Calanthe rubens* both white and pink grew in clefts in the rock, with *Eulophia Keithii*, *Cissus discolor* with its ornamental green, white and purple leaves climbed over the rocks everywhere, as it does all over this region, but no flowering specimens were seen anywhere. A blue flowered Balsam (*Impatiens Scortechinii*) was not uncommon but we only secured a single plant in flower. We, however, got more of it at Tebing Tinggi.

Ferns were represented by strictly xerophytic species. *Doryopteris ludens*, *Asplenium caudatum* and *Adiantum caudatum* all of which were abundant. Rhinoceros hornbills and the smaller vulture were the chief birds observed. We were all very thirsty by the time we got down and were glad to get to a Malay house and have a rest, and get a good drink of cool water. Limestone rock climbing seems to me the thirstiest kind of work there is. Possibly the air is dryer in such spots.

March 1. We started for Ginting Kabok, where we were told that there was some forest remaining on the flat. Mat and I took a gharry to the seventh mile on the Setul road.

and crossed the rice fields in the direction of the main ridge of hills for about three miles. The rice field weeds were not nearly so perished as they were at Alor Sta and we were able to get many small and interesting plants, *Geissaspis* a curious little kind of vetch, with yellow flowers, peeping out from large shield well, like bracts was in flower, and so were several other of these little vetch-like plants. We first after crossing the fields came to a limestone hill surrounded by very dense vegetation, but this promised little, so we pushed on and came to a sandy heath; a dry stream bed floored with rounded sandstone pebbles and gravel as big as shot, formed an excellent path. This heath country covered with bushes and small trees proved a most delightful botanizing ground, producing many beautiful and interesting plants. Conspicuous were two kinds of slender twiggy shrublets (*Holarrhena*) 2 or 3 feet tall with a few narrow leaves towards the ends of the erect twigs and beautiful pure white flowers one and a half or two inches across, resembling those of the white variety of *Vinca rosea*. They bore long pods full of narrow seed with long buff colored plumes. We found these plants and a third kind later, all over the sandy heath districts of Perlis and Setul, and brought home living plants for cultivation, as they are most attractive.

On crossing a piece of turfy land near a stream we saw four spur-winged plovers (*Lobivanellus*), running about and taking short flights like lapwings. Passing some abandoned Campong land we came to a flat piece of forest, somewhat damp which was the pass (Ginting). The track led between the main range and a secondary ridge of limestone hills. This track was sandy and gravelly with the shotlike sandstone gravel, and boulders of sandstone. There has obviously been a sandstone ridge between the two limestone ridges which has been denuded away.

After passing through this wood, which produced many additions to the collecting book, we came out by a native house in a small coconut plantation and refreshed ourselves with coconuts. On a tree near by grew the beauti-

ful orange coloured *Saccolabium S. miniatum citrinum* in full flower. As it was now past mid-day we retraced our steps and returned across the rice fields heavily loaded with spoils.

Going through the forest we heard the Wawa, (*Hylobates agilis*), and saw tracks of wild pigs, but no other animals of any size seem to occur here. There were a few leeches in this forest, but they seem to be rare in this region.

March 2. I went with Mat and Hussein to explore the hill called Bukit Hangat Besih, standing in the rice fields north of Kanga village. A very characteristic rice field tree is *Dolichandrone Rheedii* (*Bignoniaceae*). This is typically a tidal river tree of a low bushy type, but here in the paddy fields, it grows in the form of a rather shabby poplar; the stem is stout 2 feet or more through and the branches tall and erect with few leaves, giving it a ragged appearance. This is so to say somewhat atoned for by its flowers. They are white with a long tube, and a spreading circle of petals, and very fragrant, scenting the air deliciously in the early morning. The flowers are nocturnal, apparently opening after dark and commencing to fall by seven o'clock in the morning. The tree is about 60 feet tall, and is the commonest one in the paddy fields. Doubtless it is one of the relics of the time when the whole of this country was a tidal swamp, gradually filling up after the disappearance of the sea which overlay all this area. There are several more seashore plants still scattered over the paddy-fields such as the sand-spurge, *Euphorbia Atoto*.

At the foot of the rocks we came upon a young monitor lizard, or Biawak (*Varanus salvator*) which had been just killed by some animal. The head had been eaten off, part of the back torn and the tail bitten off. It was quite fresh and the blood was still liquid. It was probably killed by a wild cat, which had fled at our approach.

We clambered up the hill to near the top following the tracks of wild pigs which seem to climb these rocky hills with ease. The flora proved very barren. A tall *Sterculia* like *S. foetida*, a small leaved *Eugenia*, a *Memecylon* and the

ubiquitous holly leaved *Hydnocarpus ilicifolius* extremely abundant all over these hills and very troublesome to push through from its prickly leaves, formed most of the trees and shrubs and none except the last were in flower. The only undergrowth was the fern *Adiantum caudatum*, and at one spot we found some of the blue balsam. There seemed to be practically nothing else.

The Serow (*Nemorhoedus*) is said to occur on this hill as it does on most of the limestone rocks, but one never meets with it or sees any tracks of it. The Chinese we were told had lately caught four in traps (jerats) in the neighbourhood. They value them at 27 dollars a piece. The tongue alone is worth ten dollars as a cure for broken bones. The Serow when it breaks its leg on the rocks, repairs the damage by continually licking it, hence it is obvious to a Chinaman that its tongue carefully dried will heal similar breakages in the human body. The blood of the animal is also valued as a medicine.

It appears to be the custom here on going on a journey or starting on any undertaking to lay a square of bamboo lattice a foot or more wide over some cockle shells and Siamese cents, and so leave it to bring prosperity. The essential seems to be to throw away some money, and as Siamese cents are cheapest they are preferred. We came across one of these votive offerings in a field behind the village, and Hussein as soon as he saw it dashed at it kicked off the bamboo and pocketed the cents. I saw another one quite similar at Tebing Tinggi, left near the spot whence boats start down the river. I never remember to have come across this custom elsewhere.

The main range of limestone hills runs down to the river bank at Tebing Tinggi which may be called the port of Kanga, for the steamers come up there to take passengers and goods for Setul or Penang. It is only three miles from Kanga with a good road, but to save time we drove there on March 3. It is a most picturesque spot, with the lofty cliffs quite precipitous and clothed to a large extent with trees and



climbers, and the small village at the base and the river fringed with Nipa and other tidal vegetation, winding along beneath it. We spent the day collecting at the base of these cliffs and obtained a large series of additions to the collection. We had heard of a marvellous cave here from which a river issued, and in the afternoon went in search of it. After going northwards along the cliff base for about a mile and a half, we came to a stream of some size and found that it did indeed issue from a hole or tunnel in the limestone rock, but the tunnel was only about 6 feet high and the water apparently 3 or 4 feet deep, so that it was more like a drain-mouth than a cavern, and did not at all come up to the glowing description of the natives. The main cliff here receded forming a kind of valley and the stream probably came from the base of the cliff through a flat stratum of rock now covered by cultivation which might perhaps be the remains of the talus fallen from the cliff and so forming the bay or valley. This wonder of nature is close to a mosque and graveyard.

Two of the most striking plants on these limestone cliffs are the Siamese cycad, *Cycas Siamensis* and the Gouty Balsam *Impatiens mirabilis*. The cycad grows high upon the cliffs at or near the top. It has a long thick white stem usually swollen at the base, which often hangs down the side of the precipice curved into strange shapes and looking like some weird white serpent. It is often fifteen feet in length and about six inches through. The Gouty Balsam grows lower down. Its swollen brown stem is of all manner of shapes, straight or curved, branched, and swollen in one part or another according to the pressure of the rocks on which it grew. It was mostly small here, about one or two feet tall, but Mr. Curtis found it in the island of Terutau seven feet high and regularly branched looking like the antlers of a stag seen over the rocks. The stem is so soft that it is broken in two by a slight jerk and is as pulpy as a boiled carrot. It was coming into flower at the time of our visit. It only produces one or two leaves on the ends of the branches and a raceme or occasionally two of yellow coalscuttle-shaped flowers. It is



one of the only balsams known, which has the flowers in a raceme and this is not rarely branched. We got another plant of the blue balsam in full flower which was a find as we had only found a single flower before. A flock of lotongs (*Semnopithecus*) dark grey above, paler beneath, with a circle of white round the eyes, were feeding in the trees at the base of the cliffs, and I noticed two or three of the little squirrels (*Sciurus notatus* apparently) running across the vertical face of the smoothest part of the cliffs with ease. Monitor lizards (*Varanus*) were abundant all over this district and we often saw them scuttling off. I saw here too a very pretty little tailor bird (*Phyllergates cinereicollis*) of an olive yellow colour with a pure white throat and red head. It was very tame and let me approach it closely.

March 4. We went to the strange box shaped hill of Chupeng, by gharry, a drive of seven miles. This is a large square shaped hill or block of limestone with vertical precipitous sides. After putting the gharry up at a shed by a small shop, a short walk took us to a rocky path which led to a cave of some size. This cave descends a little and then ascends to another mouth at some altitude from which a fine view towards the southwest is obtained. This cave is full of sea bird Guano of a brownish white colour and quite soft and powdery. It is being worked for export. Higher up the cliffs we saw bamboo ladders by which the Malays ascended to procure the guano, bags of which ready to be sent to Perlis we saw at the shop on our return.

The occurrence of this immense quantity of Guano so far inland shows clearly that the whole of the plain country over which one looks from the cave mouth was formerly and perhaps at no very distant date covered by sea and abounding in sea birds.

On a rock face just opposite the cave opening we found a patch of a bright green and exquisite little fern, only about three inches tall. It proved a new species to be named *Lastrea chupengensis*. A curious little creeping plant with stout tuberous woody roots and pretty pink flowers grew in dryer spots. It was *Boerhaavia repanda*.

On descending the pathway again we went along the western face of the hill towards the North. The chestnut swallow, *Hirundo badia*, darted about in and out of the caves, where it seemed to be nesting. It is very common at all the limestone hills in this region.

The flat country at the base of the hill was covered with a low and dense scrub of grass and bushes, with small trees, very troublesome to get through. There were cow and wild pig tracks, but they seemed to go nowhere except into the densest thorny thickets. Eventually we pushed our way through to the face of the hill again and returned to the hut for lunch. After this we followed a road past the hill towards the North, and collected in the low woods on this side, where in the morning we had heard the shouts of a party of Malays chasing mouse-deer (*Tragulus*) into a net. The soil at the foot of the hill is rich and red and there is a small plantation of coconuts and some young rubber trees here. The locality was an excellent botanical one and we had both of the collecting books full before we started homeward with the gharry, walking till we came to the ricefields and filling up the gharry itself with new or rare plants. So much did we get this day that it took all the morning of the next day to put them into presses, and make a further supply of the frames for them. In the afternoon, which was very rainy, we walked across the fields towards a hill, called Bukit Telor Jambu, and found some grand plants of *Vanda gigantea* with long spikes of its large yellow and brown flowers. They were growing on a tree of *Dolichandrone*. Next day we crossed the fields to this hill to explore it and came to a dry grassy spot leading to a path between the limestone cliffs. Here we saw a vulture on its nest in the top of a tall tree. The nest was of large size and built of sticks. Other vultures were sitting on the branches. There were many nests of the Weaver bird, (*Ploceus* sp.) on a betelnut palm. Most of them were built of grass in the ordinary way, but one was formed of the twisted up leaflet of the palm from the end of which it hung. The leaflet seemed to have been folded so as to make

a ball, leaving a hole at the side into which I saw the bird enter; unfortunately it was too high to reach. I certainly never before saw a weaver bird make its nest in this way. The wood produced a number of interesting plants including a tall erect rattan like a *Bactris*, the stems about 15 feet tall and over an inch through growing in a tuft. We later found this palm common about Perlis and Setul in wet spots. It was *Calamus arborescens*. A very pretty bushy *Ixora* with delicate white feathery blossoms was new to me, and further on in open grassy country we found the curious *Amorphophallus Rex* in full flower. At the foot of a high precipitous cliff where we lunched, the ground was very dry and dusty and was evidently the resort of numerous jungle fowl, whose scratchings and foot prints were very conspicuous. We put up four large brown fishing owls, *Ketupa javanensis* apparently; these seem to be very common about the rocky hills all over this country, and on the way back across the ricefields, came upon four black and white storks *Xenorhynchus Asiaticus* which seemed very tame and allowed us to approach close to them, only flying to a short distance when we came within a few yards and settling again. They appeared to be feeding on the small fish and crabs which abound in the shallow water of the ricefields. The natives catch the fish in these places with a cone shaped rattan basket with a series of strips of cane across the broad end arranged so that when they plump the basket broad end down over the fish they see swimming in the shallow water, the fish are caught in the basket and cannot escape. We saw a party, man, woman and a boy catching fish like this at Chupeng. A similar trap is used in New Guinea.

On the 7th, we again went across the river to Bukit Lagi and walked along the base of the rock through the wet fields. There are many curious shaped caves of no great size at the base of this hill tenanted largely by monitor lizards (*Varanus*.) The mud of some of the cavern floors was densely covered with foot tracks of these animals, some evidently very large. In one damp spot among the rocks we first found the birds

nest fern, *Thamnopteris nidus*. This fern, so common in the south of the Peninsula, is quite rare here. No doubt most of the country was too dry for it. The rarity of ferns in this region when compared with their abundance in the South is very marked. Many very common ones are quite absent, and the few that one sees are all hard textured species, in fact xerophytic ferns.

Butterflies do not seem to be very plentiful over this country or perhaps were less so than usual at the time of my visit. An old favourite *Junonia Wallacei* was common in the grassy meadows. It is a charming little butterfly with its violet blue patch on the upper wings of the male, and is distributed over the whole Peninsula as far south as Singapore Botanic Gardens, but not very common here. It is very abundant near the Penang waterfall. I saw too at Chupeng a wonderful little butterfly black and transparent waterblue *Leptocercus curius*. It vibrates its wings as it flies so that it looks almost like a blue mist or the ripples on water. Hence it is called the rippling water butterfly. It occurs also as far south as Singapore. By the cave of Chupeng the fine brown and orange *Thaumantis pseudoliris* was abundant, keeping in the shadier paths. *Cyrestes perianther* was in great force in Setul at Bukit Rajah Wang, and *Papilio Antiphates* var. *pompilius* was also not rare about Setul.

The next two days were occupied in sorting out and preparing the plants already collected and in two visits to the hill known as Bukit Hangat Besih behind the house, which hill on the second day we walked entirely round. There were a great many interesting trees and shrubs here, and many were conspicuously thorny showing the xerophytism of this region. As we were about to cross a stream beneath an archway of bushes, Mat spied a very large snake coiled up in the boughs overhead. It was the black and yellow ringed snake known as Ular Chin Chin Mas by the Malays, and *Dipsadomorphus dendrophilus* by Naturalists. It is by no means an uncommon snake all over the Peninsula and is

usually to be found coiled up on branches overhanging streams, especially in mangrove swamps. It is a harmless snake, but much resembles in appearance the venomous and vicious *Bungarus fasciatus* which haunts similar places. *Dipsadomorphus* is a very quiet and docile animal. Many years ago a party, of whom I was one, went to Serangoon in order to help to catch some of these snakes for a gentleman who had a fancy for taming them. We caught eight of them in the afternoon and could have caught more, noosing them with a slip knot on a long stick on the branches of the mangroves. If the would-be captor missed at first to put the noose over its head, the snake was very clever at dodging it the second time, and generally escaped, taking to the water and concealing itself in a hole in the mud or under a root. They were put into a bag, where they remained quiet, and in a surprisingly short time became tame enough to handle and did not attempt to escape or bite.

We returned about mid-day and spent the remainder of the day in packing up in order to start next morning for Setul. On the 10th, we drove to Tebing Tinggi about 7 o'clock and the little steamer Unpeng having arrived at 8, left at 9-25. The river winds somewhat abruptly till the range of limestone hills which runs down to Tebing Tinggi is passed. The main range ceases at this point, being broken up into more isolated blocks to the South between which the river flows. After passing the range we came to a flat sandy and muddy plain on which was a large village, and so out into the shallow sea which is clearly silting up. Many curlews and other mud haunting birds were flying over the mud flats. The course by which alone the steamer can get to the Setul river mouth is very sinuous, and is marked out by stakes. It is impossible to enter either river except on a high or rising tide, so that the steamer has to adopt its voyages to the tides and frequently has to wait a long time before crossing the bar. It is clear that the whole of this area is silting up towards the Lankawi islands just as the Kanga district of Perlis has already done.

The course of the steamer goes across West half way to the Lankawi islands, and then turning abruptly North to the mouth of the Setul river. After steaming up the river for some time we arrived at the landing place two miles from Setul town at one o'clock. We had telegraphed for gharries to meet us and for the resthouse to be prepared, but found that as it was the day of the Malay feast Mandai Saphir, the officials were away commemorating the occasion and the telegram had been received by no one. Though Setul is a Siamese country I found that most of the officials were really Malays, though with Siamese names, and the greater part of the population consisted of Malays and Chinese, the Siamese being few in number. It did not take long to telephone for gharries, and we soon arrived at the rest house, where the old caretaker quickly unearthed the cook, and got what furniture I required from a house a mile away, where it had been stored. The rest house is a good building and has even a billiard room annexe, patronized chiefly by the Siamese officials. In the afternoon I strolled round the vicinity, which is very sandy, and noted *Andrographis paniculata* with its pretty white flowers as a garden weed, and many grasses, including *Aristida Ascensionis* its most southern point here I believe. The trees were chiefly Cashew-nuts on which grew *Platyserium Wallichii*, coconuts, *Erioglossum edule* the Mertajam, now in fruit to the joy of the village children, who revel in its small astringent and sweet purple fruits.

The chestnut swallow *Hirundo badia* was dashing about the house in company with other swallows. Its presence being accounted for by the great limestone block, Batu Berjongkong, not far off the village. It rained furiously from about five p.m. till dark.

11th, we started out early along a wide and promising looking road towards the northeast, but it suddenly ended at the river and a dense forest of tidal plants, *Carapa*, *Aricennia*, *Phoenix*, etc. Unable to get further in that direction we returned and walked to Batu Berjongkong. All the water in the district seems to collect round these limestone blocks



and the rivers run close under them. The fields around were swampy, and at the base was a dense mass of tidal river plants *Acanthus ebracteatus*, *Acrostichum aureum* and *Pandanus*. Pushing and cutting our way through this we came to the base of the cliff, which is precipitous and full of caverns of no size, and pools of water. A large brown owl (*Ketupa*) flew out of a cavern and sat on a rock gazing at us, and monitor lizards scuttled away. We pushed through the scrub along the eastern face and came out into pasture again, but a heavy rainstorm drove us to refuge in a cavern. After the storm was over we went along the pastures, very wet, in the direction of Batu Rajah Wang, the next limestone block. Between the two is a deep swamp almost entirely covered with the rather scarce sedge *Heleocharis equisetina*. The water was up to and above the knees, but there is a kind of track across. In the pastures, apparently abandoned rice-fields, were abundance of the two sundews *Drosera Burmanni* with white, *Dindica* with pink flowers, and yellow flowered *Xyris* and many other pretty little plants.

The ground rises to the East of these wet fields and becomes sandy forming a heath land in parts, with low bushes, and numerous grasses and sedges, with a turfy soil. In parts it is all sand with bamboo bushes, shrubs and small trees. This heath land stretches from the village as far as the river, and is a delightful botanical region. The nearest approach to this style of vegetation it bears is the large sandy area near Pekan on the Pahang river, and in this district I found in 1891 many plants which were also common on the Setul heath. But this latter was much richer, and contains many plants of a more northern type. While the greater part of the Pahang heath flora consisted of Malayan types more or less modified for their surroundings. The idea suggested by comparing the two heath floras was that while that of Setul had been formed from Indo-Chinese plants migrating south, that of Pekan was composed of such Malayan plants as could adapt themselves to a xerophytic condition and a sandy soil, together with a few of the Indo-Chinese plants which had



contrived to push down as far South, and a few Australian types which had crept along the coasts of the islands westward.

We explored this heathy district several times, and obtained a great variety of plants from it.

The characteristic trees of it are *Eugenia grandis*, the Jambu Ayer Laut, a typical sandshore tree further south. *Dillenia aurea*, with its beautiful large yellow flowers, and *Melaleuca leucadendron* the Gelam. This latter grows abundantly along the swampy peaty parts of the heath fringing the river. It was often said that the Gelam tree only occurred in the Malay Peninsula near old Dutch Settlements as at Malacca, and that it was introduced by the Dutch from the islands further East. Near Malacca it grows in the same kind of woods as in Setul, somewhat peaty soil with much standing water, and I have little doubt is indigenous there. In Singapore a portion of the town is still known as Kampong Gelam there are no Gelam trees there now, but it is probable that it got its name in the early days when the tree grew there. I have also seen one tree of large size at Changi, in a spot which certainly was never under Dutch control and where it is highly improbable that any one else planted it. I have not seen it except where obviously planted any where else except the places mentioned, either on the East or West coast. It grows in great abundance on the Setul heath, and also I was told in similar spots near Kanga in Perlis.

Among the more interesting of the plants of the heath were a species of *Thysanotus* one of the *Liliaceae* a typically Australian genus, the only other outlier of which occurs in Hongkong and the Philippine islands. It is described below. With it grew a pretty terrestrial orchid *Pachystoma* with nodding pink flowers, numerous sedges, *Fimbristylis*, etc., sundews, many *Convolvulaceae*, and *Scrophularineae*. Orchids were scarce the most showy epiphytic ones being *Dendrobium secundum* with its bright pink flowers, *Bromheadia palustris* and the pretty rose pink *Habenaria roseata* of which only one could be found in flower, a single plant in flower of the leafless *Vanilla*, and a few others were all seen.

The heaths are often fired it appears, and this may account for the absence of many plants, besides the season was comparatively late and many plants perhaps out of flower.

On the 13th, we crossed the heath and went across the river by the main road and cut across the country to a more distant limestone block Batu Bunga. After crossing a deep stream with somewhat acrobatic feats we arrived at the rock and attempted to ascend it, but it soon got too difficult and as it seemed very barren we descended and walked round it, and found an easy way of getting to it without crossing any streams. After returning and lunching we went across the heath, and seeing a large number of vultures descending behind the gaol went to see what they were at. There had been a great deal of cattle plague in the district and a large mortality among the buffaloes and kine. We had several times come on the remains of cattle, either bones lying about or carcasses partly buried in shallow graves. Here we found a black bull which must have died that morning or the previous night surrounded by fifty or more vultures of both kinds, the big brown griffon *Pseudogyps bengalensis* and the smaller *Otogyps calvus* the latter being the most numerous. The bull which was already much swollen lay on its side. The vultures were quite unable to tear the hide, and were feeding on the viscera through the anal opening, which they had much enlarged. Squabbling and fighting the smaller kind were driven away from time to time by the great *Pseudogyps*. These great birds looking more like brown geese than anything else would every now and then leave their food to engage in a fight with each other, spreading their wings and lowering the head they hopped at each other like cocks fighting and struck with their claws and beaks at each other's heads. Sometimes they marched solemnly erect with expanded wings, the head drawn back so that the white ruff of the neck made them look something between an enlarged owl and an heraldic eagle. They did not seem to hurt each other in the fights, and I saw one standing on another's back and pecking its head quite disregarded for some time by the victim.

By the second day the smaller vultures had left and the carcass had much shrunk and on the third day nothing was left but the hide and bones. The decay near the shoulder where the carcass touched the ground had allowed the big vultures to lift the hide and finish the flesh of the otherwise inaccessible portions, the upper foreleg was completely pulled out of the skin and the bone of the lower jaw taken to some distance. Another bullock's skeleton I saw had been cleaned up in the same way. The destruction of so large an animal through the only small opening at which the birds could get at the viscera in so short a time was sufficiently striking, though of course, the flies which were in millions around the carcass played a large part in the destruction of the soft parts. The vultures were extremely cowardly for I saw even the large ones chased away by a very small black pariah pup, who pursued the huge birds springing into the air after them. The vultures are known as Burong Eriang by the Malays. They are absent from the lower part of the Malay Peninsula, I have seen them as far South as Bukit Mertajam, but there are two records of stray birds having been seen in Singapore and I once saw two flying over Tanglin at a great height.

They were very abundant at Perlis and Setul, but it is difficult to see what most of them managed to find to eat, and they must have often gone without food for long periods.

14th. We went in the morning along the road towards the river, and rambled to the mangrove swamp edge of it, then along a Gelam wood, and to some pasture land. We put up several snipe here. The most interesting plants met with were the minute *Stylidium* with its bright mauve flowers, and a small herbaceous *Osbeckia* and a beautiful crimson-flowered mallow, (*Decaschistia*). At one spot were numerous large tussocks of the curious sedge *Tricostularia borneensis* which I formerly got at Pekan.

We found a nest of the common turtledove *Turtur tigrinus* with one egg, in a bush. *Caprimulgus macrurus* was nesting too, we found eggs on the heath, a few days before.

After a chase I caught a small lizard with a long slender tail. (*Tachydromus sexlineatus*) running through the grass.

In the afternoon we started across the heath and as a shower came on took refuge in a house belonging to a Siamese doctor or herbalist. He could speak no Malay but a small Malay boy appeared who could talk Siamese, so we were able to communicate. He presented us with a bunch of bananas, which were fairly good ones. Probably owing to the dryness and heat and the sandiness of the country the Setul bananas are very poor and dry, as a rule. The old man suffered from lumbago, but did not know the virtues of the Gelam tree, of which on our return I brought him a bunch and tried to explain how to use it, and also gave him a note to the local doctor who he said did not understand Siamese. The small boy told us that all the village children were assured in their minds that we were collecting children's heads, with the aid of our hook which we used for pulling down branches of trees and the bag in which we put the tubers of *amorphophallus* and other plants. This accounted for the flight with shrieks of some of the smaller ones when we appeared, and the curious awe with which the bolder ones surveyed the bag when full of tubers. After the rain ceased we pushed on to Batu Rajah Wang through the swamp and climbed till we got to near the top of the rocks. Here we found a yellow flowered *Saccolabium* and a pink *Cirrhopetalum* in flower.

A number of K'rah monkeys, *Macacus cynomolgus*, and lotongs (*Semnopithecus*) frequent this hill. In the evening a solitary teal (*Dendrocygna*) passed over the house, and a number of *Pteropus* were seen.

The following day we crossed the swamp lying between Batu Berjonkong and Batu Raja Wang, to the river and went first to the foot of the former hill, at the base of which was a curious mud swamp covered with a forest of *Barringtonias*. It was impossible to ascend the cliffs here or to get round the hill as the river runs close to it, so we turned across to Batu Raja Wang and went along its edge on the river bank. The river is too deep for wading but it is possible with a little

climbing to get along the edge. After a long walk we came to a part of the cliffs through a hole in which I could see a gleam of sunlight on vegetation, and creeping through the tunnel—an old stream-bed—we found ourselves in a more or less circular space surrounded by high cliffs. At one end a great deal of the rock had fallen and the whole place was full of trees and other plants. Some of the rocks were covered thickly with the beautiful ground orchid *Haemaria discolor* making large red patches, I never saw any orchid of this group growing in such dense masses. *Amomum testaceum* a plant I had only previously met with at the Batu Caves in Selangor grew here. *Amorphophallus carnea*, *Pellionia javanica* and many other plants were added to the already nearly full collecting book, and bag. Mat climbed up by the fallen rocks and got to the top of the rock, and said that descent on the further side was possible though difficult and as we were heavily loaded I thought it unadvisable to try this short cut, so we returned by way of the tunnel, and continued along the side of the cliffs. There is another circular walled place of the same style in this hill near a quarry, containing the same style of forest flora. I imagine they are formed by streams which gradually cutting away the base of the cliff came a fall of the upper part. Similar but loftier shafts occur in the Batu Caves in Selangor. We had some difficulty in making our way loaded as we were, through a block of the erect thorny rattan, where we saw one of the common green pignosed snakes, *Dryophis prasinus*, and after crossing a stream got out into open country and reached the main road, having gone almost completely round the rock, a hard and stiff tramp.

Next day we went on the heath to collect some plants for cultivation and came across a herd of wild pigs rooting in the mud near the river. In the afternoon we packed up for leaving for Penang that night. The boat was to start at ten o'clock, but on arriving we found it would not start till 2 a.m. It was not a comfortable boat, containing no accommodation for sleeping, eating or bathing. However I put up my camp bed and

went to sleep. We started at 2 a.m. and stopped again at 7-30 in the open sea till 11-30 waiting for the rise of the tide to get into the Perlis river. On the way up the river I saw a fairly large crocodile plunge off the bank rather clumsily and saw that it had been caught by a hook and could not escape. The natives say that they never take people in this river. After half an hour's stay at Perlis, we steamed for Lankawi islands and arrived about five o'clock at Kwah, where we went ashore for half an hour and collected what plants we could find on the shore. *Tacca pinnatifida* was abundant and in flower; we dug up a number of tubers for cultivation. Kwah has much enlarged since I was there many years ago, and a fine rest house is being built. It is a charmingly beautiful spot and should make a delightful holiday place for the people of Penang when comfortable steamers run to it. A Chinaman and an European have started rubber cultivation there, though there does not seem to be any reason for selecting such a spot for this purpose. There was a little rubber cultivation also commenced by natives on the Setul heath. It is difficult now to go over any extensive area of country without seeing some.

We arrived at Penang after passing through a heavy rain storm at 2 a.m. and went on shore at sunrise. I left the same day for Singapore and arrived with our collections in good condition.

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## THE FLORA.

There is a very great difference between the floras of this region and that of the Malay Peninsula south of Alor Sta. which is best shown by the absence of large or conspicuous genera of the Malay region and the presence of a number of genera of Burmese type. To some extent this may be caused by a climatic change and the presence of a distinct dry season especially marked in the limestone flora. During this period many of the herbaceous plants completely disappear above



ground, such plants as *Amorphophallus*, *Zingiberaceae*, *Habenaria* and other terrestrial tuberous or rhizomatous plants; at the same time many of the trees become quite leafless, remaining so for a considerable period. In the Malay Peninsula a certain number of trees, e.g. *Dyera*, *Cratoxylon*, *Lagerstroemia* etc. become leafless at times but remain only a day or so in that state when the young leaves appear. In the Siamese region a considerable proportion of the trees become leafless in March and April and remain so for a considerable period, giving quite a wintry look to the landscape. During my visit the ricefields were quite dried up at Alor Sta, the grasses brown, small leguminosæ dried up, *Xyris indica* quite withered to the base, a state of affairs never to be seen in the south, where the smaller plants remain green throughout the year.

Besides this climatic difference there is also a difference in rock-formation. The rocks of the South of the Peninsula are mainly of granite, and shales, those of the Northern Siamese region of limestone and sandstone. There is however granite at Gunong Raya in the Lankawi islands, and the flora there to a certain extent resembles that of Penang. The limestone rock occurs in detached blocks down both sides of the Peninsula as far south as the Batu Caves of Selangor, and these rocks contain a number of plants not found elsewhere, than the limestone rocks of Setul and Perlis but the greater part of the Southern limestone flora is of a Malayan type.

A certain number of the sandy country plants of the Northern region have found their way down along the coast line and appear in similar spots in Pahang, but the contrast between the poor sand hill flora of Pekan, a large percentage of which are typical Malayan genera, or of widely distributed weeds, and the rich flora of the Setul heaths is very striking.

The difference between the flora of the Malay Peninsula south of Alor Sta and that of the country north is shown by the list of genera occurring in this latter region and absent from the Malay Peninsula so far as is known at present. This list would be increased considerably by the addition of other species which have been met with occasionally only on



the eastern coasts of Pahang and in Province Wellesley, and have obviously descended from the north along the coast line; such are *Phoenix* and *Coldenia*.

The list of well known Malayan genera which are apparently quite absent from the region north of Alor Sta is very large, but possibly further research might show their presence especially as some of them do occur further north in Burmah, and Assam. A certain number however appear to be entirely absent from any country north of Alor Sta, though common in the Malay Peninsula, and their northern boundary line must be placed here.

List of genera occurring only north of Alor Sta.

*Cadaba*. Distrib. Africa and India.

*Pentacme*, Distrib. Siam.

*Pentapetes*, Distrib. India. Occurs as an escape from cultivation only in the Peninsula.

*Decaschistia*, India and Cochinchina.

*Feronia*, India.

*Ochna*, India.

*Harrisonia*, India.

*Osbeckia*, India, Ceylon, China, Cochinchina and Philippines.

*Pleurostylis*, India.

*Geissaspis*, India.

*Vangueria*, India.

*Cystacanthus*, Burmah, Cochinchina.

*Rhinacanthus*. Africa and India.

*Dicliptera*, India, Malay islands

*Acanthopale*, India and Africa.

*Andrographis*, India and Malay islands (a weed in Penang).

*Barleria*, Siam, India, Africa.

*Holarrhena*, Burmah and Africa.

*Heterophragma*, Burmah.

*Phylloboca*, Burmah.

*Tetraphyllum*, Burmah.

*Exacum*, Burmah, Borneo, Philippines.

- Gymnanthera*, Malay islands, Australia.  
*Glossocarya*, Burmah, Ceylon.  
*Congea*, Burmah.  
*Orthosiphon*, Siam.  
*Moschosma*, India, China, Java to Philippines.  
*Anisochilus*, India, Burmah.  
*Buxus*. All big areas but absent from Malaya except the Philippines.  
*Adenochlaena*. India and Ceylon.  
*Dendrobium*, (§ *Speciosa*). Burmah, Siam.  
*Pachystoma*, India, Java, Borneo.  
*Stauroopsis*, Burmah and Siam.  
*Staurochilus*, Siam.  
*Kaempferia*, Burma.  
*Thysanotus*, Cochinchina to Australia.  
*Asparagus*, India, Africa.  
*Hapaline*, Burmah, Borneo.  
*Aristida*, India, Africa.  
*Corypha*. India, Borneo.

Of genera characteristic of the Malay Peninsula which are absent from this region as far as is known, the list is very large, a considerable number quite disappear at the boundary line, others occur or are represented further North, in Assam or Burmah, besides which there are a number of genera including many species in the Malay Peninsula, which in this region and beyond are scarce and only represented by one or two of the common species of the Peninsula. Such genera are *Adinandra*, *Garcinia*, *Calophyllum*, *Elaeocarpus*, *Myristica*, *Nepenthes*, *Daemonorops*, *Hornstedtia*. The following is a list of the more striking Malayan genera absent from this region. Those that seem absolutely to stop altogether South of Alor Sta are marked thus!

<i>Wormia</i>	<i>Loxocarpus</i> !
<i>Ellipeia</i>	<i>Cyrtandra</i>
<i>Drepananthus</i>	<i>Cyrtandromea</i>
<i>Mezzettia</i>	<i>Enhydryas</i>

<i>Kayea</i>	<i>Platyclinis</i>
<i>Eurya</i>	<i>Tylostylis</i> !
<i>Archytaca</i> !	<i>Ceratostylis</i>
<i>Shorea</i>	<i>Plocoglottis</i> !
<i>Hopea</i>	<i>Dipodium</i> !
<i>Anisoptera</i>	<i>Renanthera</i>
<i>Durioneæ</i>	<i>Oxyanthera</i> !
<i>Tarrietia</i>	<i>Aphyllorchis</i>
<i>Pentace</i>	<i>Vrydagzynea</i>
<i>Commersonia</i>	<i>Cystorchis</i> !
<i>Coptosapelta</i>	<i>Macodes</i> !
<i>Gre.niä</i> !	<i>Neuwiedia</i> !
<i>Lucinea</i>	<i>Plagiostachys</i> !
<i>Urophyllum</i>	<i>Nicolaia</i> !
<i>Adenosacme</i> !	<i>Lowia</i> !
<i>Morinda</i>	<i>Nenga</i> !
<i>Lasianthus</i>	<i>Iguanura</i> !
<i>Hydnophytum</i> !	<i>Cyrtostachys</i> !
<i>Pentaphragma</i> !	<i>Drymophloeus</i> !
<i>Styrax</i>	<i>Ceratolobus</i> !
<i>Leuconotis</i> !	<i>Eugeissona</i> !
<i>Dyera</i> !	<i>Homalomena</i>
<i>Urceola</i>	<i>Schismatoglottis</i>
<i>Parameria</i>	<i>Cyrtosperma</i> !
<i>Epigynum</i> !	<i>Lipocarpa</i>
<i>Didissandra</i> !	<i>Leptaspis</i> !

This list, with the previous one, gives a good idea of the complete change of flora at the boundary line. A few genera from the North have crossed the line into Province Wellesley and down the Pahang coast, and a few Malayan types have gone north and crossed to Burmah where they are scantily represented, but on the whole the two floras are as distinct as possible. One can gather from the flora that at no great length of time ago the Malay Peninsula was cut off from Burmah south of Kedah, by the sea. There were, however, a series of limestone islands lying scattered in the sea not only in this area but along the coasts of the great island of the

Malay Peninsula as far south at least as the Batu Caves in Selangor on one side, and Kota Glanggi in Pahang on the other. Denudation from the hills of the interior silted up the sea round these islands and included them in the now widened area of the Peninsula. Owing to the change of climate, due probably to the growth of forests on the new flat land along the coasts, many of the limestone plants of the north disappeared from the rocks of the Batu Caves but enough remain, especially on the highest points, to establish a connection with the flora of the limestone rocks of Lower Siam.

Meanwhile from the north denudation of the hills brought down silt to such an extent as to form dry land round the limestone islands of Perlis and Setul, and to connect Tenasserim by land with the Malay Peninsula. The wave of vegetation which covered this new land came from the North, and is of Burmese and Cochin-Chinese origin; a few plants passed northwards from the Malay flora, but the greater part of this flora is Burmese.

Of the limestone islands remaining isolated we have left the Lankawi smaller islands, Terutau, and many others to the north. Silting up round the Lankawi islands is continuing and the sea is gradually shallowing between the mainland and the islands, so that in time they will be standing in a flat land plain like the islands of Perlis and Setul. In the sea north of the Malayan region formerly lay some granitic islands which, isolated far from Tenasserim, bore a Malay flora. Some of these, such as Kedah Peak, and Gunong Perak were long ago surrounded by silt and are well inside the Malay Peninsula as we have it now. Some others Penang and the Pulau Song Song group still remain detached. Their flora contains no admixture of Burmese elements! it is typically Malayan.

#### RANUNCULACEAE.

*Naravelia axillaris*, n. sp.

A slender pubescent climber. Leaves trifoliate with 2 ovate leaflets 2 inches long by  $1\frac{1}{2}$  inch wide, with 3 nerves, which are pubescent, the third leaflet a slender

pubescent tendril an inch or more long, or the leaflet solitary coarsely few-toothed or trilobed at the tip, 3 inches long 2 inches wide, the lobes ovate acute, middle one longest  $\frac{3}{4}$  inch long, petiole 1 inch long, petiolules short pubescent. Flowers solitary axillary in pedicels 2 inches long, or in threes on pedicels an inch long with a pair of leaflike bracts, borne on peduncles an inch long, the flowers are  $\frac{1}{4}$  inch long, buds ovoid blunt. Sepals oblong obtuse  $\frac{1}{10}$  inch long green. Petals narrow linear clubbed at the tip. Stamens numerous yellow. Pistils densely covered with hair (Ripe achenes not seen).

Perlis at Kanga in hedges in the ricefields (15185).

This is very distinct from *N. laurifolia*, Wall. our common species in its small leaves and axillary flowers. The form, texture and reticulation of the leaves is somewhat like that of *Naravelia zeylanica* but they are glabrous and much smaller.

#### DILLENIACEAE

*Dillenia grandifolia*, Wall? Hook. fil. Fl. Ind. I. 71, Fl. Brit. Ind. I. 38.

A smaller branched tree of the habit of *D. aurea*, Sm. Shoots densely silky. Leaves oblong lanceolate acute serrate attaining a length of fourteen inches and a width of 6 inches, above glabrous except the sunk pubescent midrib, beneath densely softly tomentose, young leaves scantily pubescent above, base of lamina oblique truncate, nerves about fifty pairs. Petiole not winged three inches long pubescent. Buds subglobose 1 inch long. Sepals oval rounded, covered sparsely with rather long appressed hairs, margins closely ciliate. Petals oblong spatulate  $2\frac{1}{2}$  inches long, 1 inch wide at tip rounded, yellow. Stamens linear recurved, inner ones half as long again as outer ones all yellow. Pistils 12, greenish yellow.

Kedah: on Bukit Pinang near Alor Sta, in open woods (15182). Bangtaphan (Keith).

The flowers are usually produced before the leaves, Keith gives the height of the tree 45 feet. It is often shorter. The flowers are produced from the axil just below the buds.

Wallich's species appears to be based on leaves obtained by him at Penang and Malacca. However it does not appear he ever visited Malacca. The plant does not seem to have been met with again. The specimen and consequently the description is very poor, but as far as it goes it seems to fit this fine plant.

*D. aurea* Sm. Setul, on heaths; Puket (Curtis).

Distrib. India, Himalayas to Pegu, Andamans, Java and Borneo, apparently absent from the Malay Peninsula though King gives it as "Throughout the Indo-Malaya region.

*Acrotrema costatum*, Jack. Kedah: Bukit Pinang, Alor Sta.

Lankawi, Gunong Raya (Curtis); Burau Bay at the seven wells (Ridley).

Distrib. Whole Peninsula from Moulmein South to Johor.

*Delima sarmentosa*, L. Bangtaphan Beach (Keith); Lankawi sea shore of Burau Bay (Ridley).

Distrib. Assam to Johor.

*Tetracera fragrans*, n. sp.

A low sarmentose shrub. Leaves coriaceous shining above, scabrid beneath elliptic, narrowed at the base or oblanceolate, tip rounded, margins at the tip sinuate or obscurely dentate 3 to 6 inches long, 2 to  $2\frac{3}{4}$  inch wide, nerves 9 to 11 pairs, petiole  $\frac{1}{4}$  inch long. Panicle lax 6 to 10 inches, branches four inches long, rachis and pedicels covered thinly with white appressed hairs. Bracts linear acute. Flowers half an inch across fragrant. Sepals ovate rounded glabrous except the ciliate margin. Petals thin oblong white glabrous about as long as the sepals. Stamens nearly as long. Pistils 2 glabrous subcylindric.

Jour. Straits Branch



Perlis: Chupeng and Kanga (15183); Setul Heath (15184); Bangkok (Mrs. Williamson,); Endemic.

A rather handsome large flowered species allied to *T. macrophylla*, Wall. I have not seen ripe fruit. Some years ago Mrs. Williamson of Bangkok sent me a specimen as cultivated at Bangkok under the name of the "Green-grocer creeper" from its odour recalling the mixture of scents from a fruiterers.

*T. assa*, Dec. Setul Heaths and Lankawi and Pulau Adang group. Distrib. whole Peninsula.

#### ANONACEAE

*Uvaria micrantha*, Hook. fil. Terutau (Curtis 2808).

Distrib. Burmah to Malacca, Sumatra.

*U. purpurea*, Bl. Perlis, Chupeng.

Distrib. Malay Peninsula and islands, and South China.

*U. Ridleyi*, King. Setul, climbing over a tree in the paddy fields near Batu Bunga. Flowers deep red.

Distrib. Pahang and Perak.

*Artabotrys Scortechinii*, King. Lankawi (Curtis 2644).

Distrib. Perak.

*A. venustus*, King. Bangtaphan (Keith).

Flowers green. This differs from the typical form in the pubescence on its hooks and branches in which it resembles *A. crassifolius* King.

*Unona Dunalii*, Wall. Trang (Wray 2757).

Distrib. Penang and Perak.

*U. discolor*, Wahl. Kedah: Alor Sta; Perlis, Chupeng; Lankawi at Kwah (Curtis), Trang (Fox).

Distrib. British India, Burmah, the Malay Peninsula and Archipelago, China.

*U. Brandisiana*, Pierre. Terutau (Curtis); Perlis, Besih Hangat, Kanga (15177).

A tree about fifty feet tall, deciduous flowering on the appearance of the leaves. Flowers green. Distrib. Bumah.

*Polyalthia aberrans*, Hook. fil. Pungah (Curtis 2957).

Distrib. Malay Peninsula.

*P. glomerata*, King. Trang at Chong (native collector).

Distrib. Perak, Sumatra.

*P. suberosa*, Benth. Bangtaphan (Keith).

Distrib. Iadia and Burmah.

*P. velutinos*a, n. sp.

A tree 20 to 30 feet tall branches black, young parts red-hairy. Leaves lanceolate oblong base rounded, apex subacute nearly sessile, thinly coriaceous, above glabrous beneath sparingly hairy, midrib and nerves 12 pairs, densely appressed red hairy, 6 inches long  $1\frac{1}{2}$  inch wide; petiole  $\frac{1}{10}$  inch long densely red hairy. Flowers solitary sessile on the lower parts of the branches. Sepals broadly, bluntly triangular ovate hairy  $\frac{1}{2}$  inch long. Petals linear oblong subacute velvety outside  $1\frac{1}{4}$  inch long  $\frac{1}{8}$  inch wide. Stamens short oblong. Ovaries 1 ovuled, 12 to 15 ovoid sessile densely brownish velvety, torus hairy.

Lankawi, Gunong Raya at 1500 feet, (Aniff). Nearest perhaps to *P. bullata*, King, very distinct in its smaller flowers, narrower petals, and foliage smaller and not bullate.

*Anavajorea Scortechinii*, King. Lankawi: Kwah (Curtis).

Distrib. Malay Peninsula.

*Goniiothalamus giganteus* Hook. fil. Lankawi: Gunong Raya (Curtis).

Distrib. whole Peninsula.

*G. macrophyllus*, Hook. fil. Lankawi (Curtis 2538).

Distrib. whole Peninsula and Lingga.

*Orophea cuneiformis*, King. Tongkah (Curtis 2929); Setul: Bukit Rajah Wang (15342).

Distrib. Perak.

*Popowia ramosissima*, Hook. fil. Trang (Aniff).

Distrib. whole Peninsula.

*Melodorum lanuginosum* Hook fil. Lankawi (Ridley).

Distrib whole peninsula.

*Miliusa velutina* Hook. fil? Bangtaphan (Keith). The specimen hardly adequate.

Distrib. India to Pegu.

*M. amplexicaulis*, Ridl. Lankawi: Kwah (Curtis).

Distrib Perak at Lenggong.

*M. near M. amplexicaulis*, but petiolate. Bangtaphan (Keith). Specimen insufficient.

*Miliusa parviflora*, n. sp.

Small tree, with light grey bark. Leaves thin lanceolate acuminate, margins undulate glabrous except young leaves, midrib of adult and twigs pubescent 2-2½ inches long  $\frac{3}{4}$  to 1½ inch wide, nerves five inconspicuous about 12 pairs. Flowers solitary extra axillary on slender pedicels pubescent half an inch long. Sepals very small ovate acute pubescent. Outer petals similar. Inner petals 3, ovate triangular blunt pubescent outside  $\frac{1}{8}$  inch long green. Stamens few, anthers oblong the two cells separate, connective appendage triangular short erect not overlapping the others, ovaries 8 silky, style thick cylindric. Ripe carpels half an inch long oblong blunt  $\frac{1}{4}$  inch through. Seeds 1-3 flattened elliptic in outline  $\frac{1}{4}$  inch long  $\frac{1}{8}$  inch through.

Perlis, Limestone rocks; Bukit Lagi and Tebing Tinggi (15239, 15340). Very distinct in its small green flowers.

*Mitrephora Keithii*, n. sp.

Branches glabrous dark. Leaves elliptic acuminate, upper ones lanceolate base rounded apex obtuse, coriaceous glabrous shining, nerves slender 9 pairs, reticulations close and conspicuous 4-7 inches long  $1\frac{1}{4}$ -3 inches wide, petiole  $\frac{1}{4}$  inch long thick, transversely wrinkled. Flowers solitary or in pairs, axillary opposite the leaf, 1 inch across, pedicel  $\frac{1}{8}$  inch long, pedicel shorter yellow hairy. Sepals 3 ovate  $\frac{1}{8}$  inch long yellow hairy. Petals 6 in two whorls, outer whorls ovate clawed pinkish, inner ones narrower, all pubescent outside silky within. Stamens numerous oblong, appendage broad flat, grey. Pistils 10 orange, hairy. Fruit young, cylindric yellow pubescent.

Bangtaphan (Keith).

This seems very near *M. reflexa* Merrill of the Philippines differing chiefly in the fewer nerves of the leaves and their shape.

*M. reticulata*, Hook. fil. Trang at Chong (Native). Distrib. South to Malacca.

*Alphonsea Keithii*, n. sp.

An erect tree 30-feet tall glabrous except the young parts red pubescent. Leaf ovate subacute or obtuse base rounded, coriaceous 4 inches long 2 inches wide glabrous, nerves invisible above, petiole  $\frac{1}{8}$  inch long. Flowers in short red hairy panicles about an inch long, pedicels  $\frac{1}{2}$ - $\frac{1}{4}$  inch long red hairy. Sepals ovate very small red hairy. Outer petals triangular ovate  $\frac{1}{8}$  inch, obtuse green hairy. Inner petals as long or nearly so. Stamens on a raised torus about 12. Anthers oblong, appendage short triangular not covering the others. Carpels, 2 cylindric hairy. Stigma capitate.

Bangtaphan (Keith).

Only one rather poor specimen but sufficiently complete. Flowers small for the genus.

## MENISPERMACEAE.

*Tinomiscium petiolare*, Miers. Kedah, Bukit Pinang near Alor Sta. (15172).

Distrib. whole Peninsula and Sumatra.

*Coscinium fenestratum*, Colebr. Kedah: Bukit Pinang, Alor Sta.

Distrib. Peninsula.

*Limacia cuspidata*, Hook. fil. Kedah: Alor Sta (15170).

Lankawi: Kwah; Setul; Bangtaphan (Keith).

Distrib. India, Malay islands.

*Pericampylus incanus*, Miers. Setul, Bukit Raja Wang, (15163).

Distrib. India, whole Peninsula, Java, Sumatra, Borneo.

*Stephania hernandifolia*, Walp. Perlis, Tebing Tinggi; Bangtaphan (Keith).

Distrib. Africa. India, Malay Peninsula, islands and Australia.

*S. rotundifolia*, Lour. Lankawi: Kwah (Curtis); Perlis: Bukit Lagi and Telor Jambu (15164); Bangtaphan (Keith).

Distrib. Cochin China.

*Cyclea peltata* Hook. fil. Setul, Bukit Rajah Wang.

Distrib. India, Cylon, whole Peninsula, Java.

## NYPHEACEAE.

*Barclaya longifolia*, Wall. Lankawi (Curtis).

Distrib. Andamans and Burmah.

*Nymphaea stellata*, Willd. var *parviflora*. Perlis, pond near Bukit Lagi, Kanga and ditches between Juttra and Alor Sta, Kedah.

Distrib. in Peninsula, Penang, Province Wellesley, Dindings and elsewhere in the whole Indo-Malayan region and Australia.

## CAPPARIDEAE.

*Cleome viscosa*, L. Lankawi: Kwah (Curtis) Setul.

Distrib. World-wide.

*Capparis micracantha*, Dec. Kedah, Alor Sta. Common in thickets. Perlis, Kanga; Langkawi (Curtis); Trang (Kunstler).

A common thorny shrub, the flowers white, with the two lower petals with an orange yellow blotch at the base, turning deep purple.

Distrib. Burmah. By no means generally diffused throughout the Malay region, as King states.

*Capparis sepiaria*, L. Kedah, Alor Sta, growing with *C. micracantha*, Dec. Trang (Kunstler).

A scandent bush in thickets very thorny, flowers white. Common.

Distrib. India, Ceylon, Philippines, Timor, Australia.

*C. diffusa*, n. sp.

Shrub with slender branches, pubescent thorns hooked very small. Leaves distant thin elliptic lanceolate glabrous, nerves 5 pairs, margins slightly crisped, apex shortly bluntly acuminate 2 inches long, one inch wide; petiole  $\frac{1}{8}$  inch long. Umbel terminal of 5 flowers, peduncle  $\frac{1}{4}$  inch long. Pedicels filiform over an inch long. Buds globose  $\frac{1}{8}$  inch long. Sepals rounded ovate minutely pubescent  $\frac{1}{8}$  inch long. Petals white oblong blunt little longer than the sepals covered with white hairs outside. Stamens about 12. Gynophore filiform half an inch long, ovary ovoid conic apiculate.

Perlis: Bukit Lagi (15174) on limestone rocks. Possibly a form of *C. sepiaria*, but I hardly think so. The larger differently shaped leaves and the long stalked flowers in a spreading umbel seem to make it distinct.



*C. horrida*, L. F. Tongka : Gunong Toxai (Curtis). In fruit only but closely resembling a plant from the Philippines identified as *C. horrida*, L. The leaves are coriaceous slightly pubescent above thickly pubescent and reddish beneath elliptic acute or shortly acuminate base rounded, 2 inches long by one wide, nerves 8 pairs. Branches thickly velvety, thorns short curved woolly at base, apex black smooth. Fruit oblong 2 inches long  $1\frac{1}{4}$  inch through on a stout gynophore  $2\frac{1}{2}$  inches long.

Distrib. of species India to Pegu, Java and Philippines.

*C. sp.* Climbing, dry place, Bangtaphan (Keith). Like the last, but the leaves narrower nearly glabrous when adult, nerves 4 pairs ascending conspicuous. Flowers as large as those of *C. horrida*. Sepals ovate pubescent  $1\frac{3}{10}$  inch long. Petals white short lower ones truncate with purple orange blotches at the base, (as in *micracantha*). "Anthers bluish purple." May be a variety of *horrida*.

*Crataeva hygrophila* Kurz. Trang (Kunstler).

Distrib. Burmah.

*Calaba triphylla*, Wight. Bangtaphan (Keith) "shrub-tree, 15 feet high in open places. Flowers all green. Defended by red ants fearfully."

Distrib. South India, Ceylon.

#### VIOLACEAE.

*Alsodeia Scortechinii*, King. Kopah (Fox); Kasum (Curtis).

Distrib. Perak.

*A. echinocarpa*, Korth. Trang (Fox).

Distrib. whole Peninsula, Sumatra and Bangka.

*A. membranacea*, King. Lankawi; Burau Perlis, Kanga (15457).

Distrib. Malay Peninsula.

*Alsodeia lankawiense*, n. sp.

A shrub with pale stems. Leaves 4-8 inches long  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches wide, elliptic lancolate or ovate lanceolate acuminate narrowed shortly at the base, edge thickened and often slightly serrulate, nerves alternate 9 pairs, nervules and reticulations elevate and fine, coriaceous glabrous, petiole corky, glabrous or hairy  $\frac{1}{8}$ - $\frac{1}{2}$  inch long. Flowers in small axillary racemes sometimes branched, rachis corky, thick, pedicels  $\frac{1}{8}$  inch long, flowers as long drying black, unisexual. Sepals 5 ovate broad margins ciliate. Petals twice as long oblong with ciliate margins. Stamens 5, filaments terete, moderately stout. Anthers large oblong with 2 short horns at the tip, appendage broader reniform thin, no pistillode. Female flowers, similar to the male, but the stamens abortive with a lanceolate narrow appendage, ovary globose. Style cylindric stout, stigma discoid. Disc annular. Fruit globose brown verrucose  $\frac{1}{4}$  inch long.

Lankawi at Kwah (Ridley 8392) male, (Curtis 2622) in fruit. Terutau (Curtis) female.

Allied to *A. Wallichiana*, Hook. and *A. Curtisii*, but the flowers are smaller, perianth lobes ciliate at the edge. Sepals distinctly shorter than the petals and not ribbed drying dark brown not straw colour. The short blunt horns and large reniform appendage of the stamens, are also distinctive marks.

The females look very distinct in the smaller rounder more serrulate leaves, and the Terutau plant has the under surface of the leaves thickly punctate, both the females have tufts of hairs in the axils of the nerves on the back. The flowers are similar in the asexual characters however, and I have little doubt that the three gatherings are specifically identical. *A. Wallichiana* has somewhat similar asexual characters in the foliage in the two sexes.

*Alsodeia Curtisii*, n. sp.

A shrub, with pale twigs leaves elliptic lanceolate entire acuminate narrowed to the base, glabrous 6 inches long  $2\frac{1}{2}$  inches wide, nerves beneath prominent opposite 11 pairs, transverse nervules very straight and conspicuous, petiole  $\frac{1}{4}$  inch long. Flowers in short axillary racemes about  $\frac{1}{4}$  inch long shortly stalked. Sepals lanceolate shorter than the petals 5, minutely pubescent on the edge. Petals oblong half as long again. Stamens 5, filaments oblong linear or rather broad. Anther oblong, with two dark purple horn-shaped processes and a purple lanceolate ovate obtuse appendage; connate in a ring round the base. Pistil as long as the stamens, ovary ovoid. Style stout cylindric, stigma disciform.

Pungah (Curtis 2998).

Allied to *A. Wallichiana*, Hook. fil. but differing in the sepals and petals being unequal and the former not ribbed when dry, the oblong not ovate anthers with an narrow lanceolate ovate appendage.

*Alsodeia minutiflora*, n. sp.

A shrub with slender hairy branches. Leaves alternate elliptic ovate to ovate obtuse or subacute, margins dentate with short thorn-like processes on each tooth, base rhomboid or cuneate;  $1\frac{1}{2}$  inch long  $\frac{3}{4}$  inch wide glabrous and shining on both surface; petiole  $\frac{1}{10}$  inch long. Flowers solitary axillary in a tuft of ovate bracts, white minute; pedicel slender  $\frac{1}{4}$  inch long. Flowers  $\frac{1}{10}$  inch long. Sepals ovate rounded 5 glabrous. Petals lanceolate obtuse. Stamens 5, anthers elliptic oblong muticous, connective processes lanceolate acute narrower but little shorter than the petals. Style in female flower rather long and slender with short distinct arms. Fruit half an inch long, valves boat-shaped green beaked and terminated by the persistent style. Seeds globose white smooth  $\frac{1}{8}$  inch through, 2 in each valve.

Perlis at Kanga (15237); Bangtaphan (Keith).

This is most nearly allied to *A. virgata*, Hook. fil. of Ceylon, but the leaves are larger and different in shape, and the anther processes are much longer and more acuminate.

#### BIXINEAE.

*Scolopia crenata*, Clos. Lankawi: Kwah, (Curtis).

Distrib. India, Ceylon, China, Phillippines.

*S. Roxburghii*, Clos. Kedah: Alor Sta; Terutau (Curtis).

Distrib. Burmah to Sumatra.

*Hydnocarpus ilicifolius*, King. Annals of Calcutta Gardens

Perlis: Chupeng; Tebing Tinggi, Kanga very common.  
Lankawi; Kwah (Curtis 2603).

A very abundant small tree at the foot of the limestone rocks. Flowers brown with white stamens.  
Endemic.

*H. castanea*, Hook. fil. Lankawi (Fox); Gunong Raya (Aniff).  
Flowers white fragrant.

Distrib. Burmah and Malay Peninsula.

*Flacourtia sepiaria*, Roxb. Perlis, Kanga (15217).

Distrib. India, Java and Philippines.

#### PITTOSPOREAE.

*Pittosporum ferrugineum*, Ait. Lankawi, Pulau Segai (Aniff).

Distrib. Burmah, Malaya to Queensland.

#### POLYGALEAE.

*Polygala cardiocarpa*, Kurz. Lankawi small islands, Pulau Sirih (Curtis); Kasum (Curtis).

Distrib. Burma, Selangor, limestone rocks.

*Salomonina oblongifolia*, Dec. Setul heaths; a very narrow leaved form. Distrib. India, Malay Peninsula, and Islands. King gives this for all provinces of the Malay Peninsula in swampy places. It is by no means so widely distributed; being quite rare, and always occurs in dry sandy spots.

*S. ciliata*, Dec. Setul on the heath, I have only a scrap of this but it is unmistakable.

Distrib. Ceylon.

*Xanthophyllum affine*, Korth. Tongka (Curtis); Kopah (Aniff).

A big form of this very variable species.

Distrib. Tenasserim to Singapore and Islands.

*X. glaucum*, Wall. Perlis two miles from Kanga, by the roadside. Setul. Batu Bunga. Trang (Kunstler).

A big tree with a stout trunk and rose pink flowers.

Distrib. Burma and Chittagong.

#### PORTULACACEAE.

*Portulaca oleracea*, L. Perlis: Kanga. A common weed everywhere.

#### HYPERICINEAE.

*Cratoxylon formosum*, Benth. Between Alor Sta and Kanga on sandy heaths.

Distrib. Siam, Malay Peninsula and Islands.

*C. polyanthum*, var *Wightii*. Setul, sandy heaths. Bangtaphan (Keith).

Often in the form of a bush, probably from being burnt. The small broad leaves and large flowers make it look very distinct from the tall long narrow-leaved plant of the South of the Peninsula.

Distrib. India, China, Philippines.

*C. pruniflora*, Dyer. Bangtaphan (Keith).

"Tree in bamboo jungle with long spines. Petals pink ciliate."

Distrib. Moulmein.

GUTTIFERAE.

*Garcinia nigrolineata*, Planch. Perlis, Chupeng (15234); Kopah (Fox). Rather narrower leaved than usual.

Distrib. Malay Peninsula.

*Calophyllum Kunstleri*, King. Lankawi: Kwah (Curtis).

Distrib. Perak.

*Mesua ferrea*, L. Lankawi, Telaya Tujoh, Burau.

TERNSTROEMIACEAE.

*Adinandra integerrima*, Anders. Lankawi: Kwah. Setul on the heath.

Distrib. Malay Peninsula in Penang and Perak.

*Schima Noronhae*, Reinwdt. Lankawi, Sungei Batu Asap (Aniff). Setul, Bukit Rajah Wang.

Distrib. Burma and Malay Peninsula.

DIPTEROCARPEAE.

*Dipterocarpus oblongifolius*, Be. Telubini (Down).

Distrib. Borneo, Sumatra, Pahang, Perak.

*D. Duperreanus*, Pierre. Lankawi: Gunong Raya (Aniff). A new record.

Distrib. Bienhoa, Indo China.

*Pentacme malayana*, King. Lankawi: Kwah, Terutau, etc.

Perlis at Chupeng. Endemic.

*Retinodendron Scortechinii*, King. Pungah near the Rajah's Bungalow (Curtis 2934). Distrib. Perak.



*Vatica cinerea*, King. Lankawi common, Kwah, (Curtis, etc.)  
Endemic.

*Y. lankawiensis*, Ridl. Lankawi (Curtis Gunong Raya (Aniff).  
Endemic.

*Pachynocarpus Wallichii*, King. Trang (Kunstler).

Distrib. whole Peninsula and Banka.

*Pachynocarpus umbonatus*, Hook. fil. A tree 30 to 40 feet tall. Lankawi at Sungei Batu Asap (Aniff). This plant originally described from Borneo and Labuan has been collected by Curtis at Batu Feringhi in Penang, but apparently overlooked in the Materials. Curtis in his field notes calls it *P. Wallichii*, var A, distinguishing it from the true plant, his var B by its having yellow (not white), petals and larger coarsely veined leaves. The Lankawi plant has large leaves like those of *Vatica Ridleyana*, Brandis which I think should be a *Pachynocarpus* too. The stems have been attacked with galls half an inch through which are densely covered with bright fox-red hairs. The seed is smooth round and oily. Curtis gives the name Resak for it, a name applied to several timbers of this group. The Lankawi specimens are in fruit.

*Balanocarpus anomalus*. King. Lankawi (Curtis 1684).  
Endemic.

*Ancistrocladus extensus* var *penangianus*. Lankawi: Sungei Batu Asap and Gunong Rayah at 1,500 feet elevation (Aniff). Kopah (Aniff). Setul, sandy heaths. Punga (Curtis).

Common on sandy places usually near the sea in Burmah. The whole Malay Peninsula, Sumatra and Bangka. It is not usual to meet with it high up inland as on Gunong Raya.

## MALVACEÆ.

*Sida carpinifolia*, L. Bangtaphan (Keith). Perlis, Kanga.  
Cosmopolitan.

*S. rhombifolia*, L. Bangtaphan (Keith), Perlis, Tebing Tinggi.  
Cosmopolitan.

*S. cordifolia*, L. Lankawi Beach at Kwah.  
Rare in the peninsula.

*S. spinosa*, L. Bangtaphan (Keith).  
Tropics generally.

*S. humilis*, Willd. Perlis, Juttra ; Kanga, Bukit Lagi, etc.

Flowers ochre yellow, common, absent from the  
peninsula. Distrib. Tropical Africa, India and America.

*Urena lobata*, L. Perlis Kanga, Ginting Kabok etc., var *sinuata*  
Lankawi Kwah (Curtis). Cosmopolitan. A very tall  
variety about 8 feet with nearly entire very woolly leaves,  
grew on heaths at Setul.

*Wissadula rostrata*, Planch. Perlis, Juttra, Chupeng. Flowers  
white with yellow centre.

Distrib. All the tropics. Rare in the peninsula only  
in Pahang.

*Decaschistia pulchra*, n. sp.

A small shrub 1 to 2 feet tall branched. The stems  
sprinkled with stellate hairs. Leaves opposite ovate or  
orbicular obtuse, base broad slightly retuse or entire, ser-  
rate, nerves 8 radiating from the base, covered with  
stellate hairs equally on both sides, 1 inch long and as  
wide, petiole as long slender. Flowers numerous but  
opening singly crowded at the ends of the branches nearly  
sessile in the axils of reduced leaves. Epicalyx campa-  
nulate with five linear acuminate lobes, tube short hairy or  
glabrescent, lobes stellate hairy. Sepals linear acuminate  
hairy. Corolla nearly 2 inches across crimson, petals 5

spathulate, apex broad rounded margins ciliate one inch long  $\frac{3}{4}$  inch wide at the tip. Androecium slender, anthers about 20 small elliptic. Pollen grains large globose hairy. Stigmas 10 on short free style arms, capitate hairy. Capsule  $\frac{1}{8}$  inch long stellate hairy. Seeds angled with rounded backs brown shortly hairy. Setul, on sandy open heaths (15236).

A very pretty crimson flowered mallow.

The genus is one of a few species occurring in India and Cochín-China.

*Hibiscus surattensis*, L. Setul, heath at base of Gunong Raya. Tropics generally.

*H. macrophyllus*, Roxb. Trang (Fox), Distrib. Indo-Malaya.

*Bombax malabaricum*, Dec. Lankawi, Terutau (Curtis) Distrib. Andamans and India.

#### STERCULIACEÆ.

*Sterculia elata*, Roxb. Perlis, Besih Hangat. A tall tree flowers green. Distrib. Burmah.

*S. foetida*, L. Perlis, Kanga.

Distrib. Africa, India, Malay islands and Australia.

Occasionally to be seen about the peninsula but apparently only planted.

*S. pubescens*, Mast. Terutau (Curtis), Distrib. Malacca.

*Helicteres hirsuta*, Lour. Lankawi (Curtis), Perlis Kanga, Bangtaphan (Keith). Distrib. Indo-Malaya, China.

*H. angustifolia*, L. Heaths Setul. A twiggy shrub with white flowers. Distrib. Nicobars, Mergui, Siam, China and Perak.

*Helicteres parviflora*, n. sp.

"A jungle shrub 15 feet tall," erect, branches slender densely tomentose. Leaves alternate lanceolate acuminate base rounded, margin dentate 3 inches long 1 inch wide,

above sparingly stellate hairy, midrib densely hairy, beneath grey closely stellate hairy, nerves from the base 5 laterals above from the midrib 5 slender rather inconspicuous, petiole  $\frac{1}{10}$  inch pubescent. Spikes of flowers very short  $\frac{1}{8}$  inch long. Calyx tubular woolly unequally lobed. Petals short hardly longer than the calyx spathulate undulate pale violet. Whole flower hardly  $\frac{1}{4}$  inch long, Stamens 10 connate, anthers very small. Fruit not seen.

Bangtaphan by the road side (Keith).

Remarkable for its extremely small flowers.

*Melochia corchorifolia*, L.

Perlis, Ginting Kabok; Setul, cosmopolitan weed.

*M. velutina*, Bedd. Lankawi, Kesap (Aniff). Perlis at Kanga (15219). Flowers rosy. Distrib. Indo-Malaya.

*Pterospermum Blumeum*, Korth. Lankawi at Kwah (Curtis).

Distrib. Burmah, Assam, Malay peninsula and islands.

*Pentapetes phoenicea*, L. Perlis Kanga, at Besih Hangat in pastures abundant and obviously wild. I have collected this in Bukit Jitan, Johor, and Perhentian Tinggi in Negri Sembilan (No. 10057) but am doubtful as to whether it is wild in these places. It is sometimes cultivated for its beautiful flowers. Distrib. India to Burmah.

*Commersonia platyphylla*, Andr. Trang (Fox).

Distrib. Peninsula and Archipelago.

#### TILIACEÆ.

*Grewia umbellata*, Roxb. Tongkah (Curtis). Common in the Peninsula.

*Triumfetta rhomboidea*, Jacq. Bangtaphan (Keith). Cosmopolitan.

*Corchorus capsularis*, L. Perlis, Kanga, a weed.

King is in error in stating that this, the jute, is cultivated here and there in all the provinces. It is never cultivated and only occurs casually.

*C. acutangulus*, Lam. Perlis, Tebing Tinggi. Bangtaphan (Keith). Distrib. all the tropics.

*Eloeocarpus petiolatus*, Wall. Trang (Fox).

Distrib. Malay peninsula and Sumatra.

*E. robustus*, Roxb. Setul.

Distrib. Himalayas to Burmah, Andamans, Pahang and Penang.

*E. paniculatus*, Wall. Lankawi, Kesap (Aniff).

Distrib. Malay peninsula.

*Schoutenia glomerata*, King. Tongkah (Curtis).

Distrib. Johor.

*Columbia diptera*, n. sp.

A tree about 40 feet tall, young parts pubescent. Leaves young thin lanceolate long acuminate, base nearly equilateral rounded nearly glabrous, nerves about 5 pairs; older leaves more stiffly coriaceous quite smooth above with inconspicuous nerves, nerves beneath elevated, nervules horizontal, scabrid, midrib pubescent 4 inches long 1 inch wide; petiole  $\frac{1}{4}$  inch long slender. Inflorescence secund with short branches half an inch long. Flowers not seen. Fruit 2 winged top retuse, base broad glabrous striate, wings rounded, half-an-inch long  $\frac{3}{4}$  inch wide, ovary 2 celled, 2 seeded.

Perlis at Besih Hangat (15221).

This certainly looks much like a *Columbia* but the fruit is only 2 winged. The tree is deciduous and the leaves vary very much according to age. No flowers were to be seen.

*Columbia Curtisii*, n. sp.

Tree, leaves lanceolate base shortly cuneate slightly unequal, margins entire above sparingly pubescent, stellately beneath more densely so and grey, nerves ascending four pairs. 3 inches long 1 inch across, petiole  $\frac{1}{4}$  inch long. Inflorescence terminal pubescent. Flowers not seen. Fruits three-winged, wings oblong rounded  $\frac{3}{4}$  inch across the two striate pubescent, apex of fruit retuse base narrowed cuneate.

Lankawi, small islands (Curtis 3692). No flowers have been obtained of this unfortunately, but it does not appear to be any form of *C. serratifolia*, as it is not hairy nor are the leaves white beneath. The only species at present described from the peninsula is *C. integrifolia*, Ridl. of Lenggong, Perak. The genus is Cochin Chinese, a Bornean and Philippines and Burmese.

## MALPIGHIACEÆ.

*Hiptage madablota*, Gaertn. Perlis, Bukit Lagi near Kanga.

Distrib. India, China, Malay Archipelago.

*H. sericea*, Hook. fil. Tongka, Gunong Toxai (Curtis).

Distrib. Burmah, Malay peninsula.

## GERANIACEÆ.

*Impatiens mirabilis* Hook. fil. Terutau (Curtis). Perlis Tebing, Tinggi and other places near Kanga.

This extraordinary plant occurs commonly on the limestone rocks all over the Kanga District. It was just commencing to flower at the time of our visit though many of the plants were still leafless. The fleshy stems which are as soft as a boiled carrot, took all manner of forms simple, branched, straight, curved, cylindric, tuberos ; indeed no two seemed quite alike.



*Impatiens Scortechinii*, Hook. fil. Perlis, Tebing Tinggi and Bukit Lagi, as well as other limestone rocks. The stem is curiously fleshy, the flowers blue and white.

*Impatiens macrosepala*, Hook. fil. Kasum, Curtis (3217). "It occurs only in ten places on limestone islands and attains a height of 2 to  $2\frac{1}{2}$  feet." It also occurs at Ipoh.

*Hydrocera angustifolia*, Bl. Setul. Perlis, Kanga paddy fields. Bangtaphan (Keith).

Leaves linear narrow, flowers deep rose with darker blotches.

Distrib. India, Ceylon, Malay peninsula in Penang.

#### RUTACEÆ.

*Glycosmis pentaphylla*, Corr. Setul, open country near Batu Bunga. A bush. Distrib. Eastern tropics.

*Gl. rupestris* n. sp.

A shrub with white bark. Leaves 1-3 foliolate leaflets broadly lanceolate coriaceous narrowed at both ends, margins undulate variable in size 1 to 5 inches long,  $\frac{3}{4}$  to 2 inches wide, petiole  $\frac{1}{4}$  inch. Panicles all in lower axils half an inch long, red scurfy, pedicels very short. Calyx of four orbicular sepals. Petals 4 oblong white glabrous dilate at the tip  $\frac{1}{8}$  inch long. Stamens 8, 2 shorter than the others, shorter than the petals glabrous, filaments dilate at the base narrowing upwards. Anthers elliptic. Pistil cylindric shorter glabrous glandular with a discoid stigma, base of ovary narrowed. Disc very obscure. Fruit globose shortly stalked crowned by the short style and discoid stigma, less glandular than in most forms  $\frac{1}{4}$  inch long.

Kedah on Gunong Geriang (15467). Perlis Kanga (15468).

This is certainly nearest in many points to *puberula*, Lindl, but the ovary is quite glabrous. Variable as the common *pentaphylla* is this plant does not resemble any form of it known to me, the leaves are smaller, most being short, broad and rounded, and the nervation is different, the short axillary panicles, the rusty pubescence of the peduncles and pedicels, give it an entirely different appearance.

*Micromelum hirsutum*, Oliver. Trang (Fox).

Distrib. India to the Philippines.

*M. pubescens*, Bl. var. A form with fewer leaflets crenulate and glabrous, possibly a distinct species. Perlis, Tebing Tinggi.

*Clausena excavata*, Burm. Perlis, Ginting Kabok; Setul; Bangtaphan (Keith).

*Atalantia monophylla*, Correa. Lankawi (Curtis). Perlis. at Chupeng.

A small bushy tree with little round green oranges.  
Distrib. India, Ceylon and the Peninsula.

*Feronia elephantum*, Correa. Perlis in old cultivated land at Kanga, possibly not wild (15218). Distrib. India, absent from the Peninsula.

*Erodia roxburghiana*, Hook. fil. Lankawi, Kesap (Aniff).

Distrib. Indo-Malaya.

#### SIMARUBEÆ.

*Harrisonia Brownii*, Juss. A sarmentose bush very thorny, Keith describes it as ten feet high with branches 80 feet long. Petals dull red, (purple 6 in number, Keith). Stamens 12, white, stigma yellow (Keith).

Perlis, Ginting Kabok, in open heath-land. Bangtaphan (Keith)

Distrib. Andamans, Timor, Philippine, North Australia.

*Brucea sumatrana*, Roxb. Perlis, Chupeng, Pomga (Curtis).

Distrib. Whole Peninsula, Sumatra and India.

*Eurycoma longifolia*, Jack. Setul in sandy spots. Distrib. Burmah, whole Peninsula and Islands.

#### OCHNACEÆ.

*Ochna Wallichii*, Planch. Tongka (Curtis).

Distrib. Andamans, and Burmah.

*O. grandis*, n. sp.

Low branched tree, "15-20 feet high gnarled"  
Leaves deep shining green elliptic acuminate often blunt or mucronulate margin serrulate with small distant points, coriaceous 4-5 inches long  $1\frac{1}{2}$ -2 inches wide, petiole  $\frac{1}{8}$  inch long. Stipules small lanceolate caducous. Flowers in extra-axillary cymes of 2 or 3, peduncle half-an-inch long, pedicels  $1\frac{1}{4}$  inch long. Sepals 5 oblong  $\frac{3}{4}$  inch long  $\frac{1}{4}$  inch wide, blunt. Petals not seen. Stamens very numerous, filaments slender half-an inch long, anthers very small, deciduous. Styles united to the apex much longer than the filaments  $1\frac{1}{4}$  inch long. Disc over  $\frac{1}{4}$  inch across when dry.

Perlis Heath near Ginting Kabok; (15037). Bangtaphanoi (Keith).

In both specimens the petals had fallen and the anthers too had disappeared. Dr. Keith's sketch however shows a very small oblong anther. The large size of this tree, widely spreading, its large leaves and large flowers distinguish it from any species I know.

#### MELIACEÆ.

*Aglaia palembanica*, Miq. Lankawi Gunong Raya (Aniff) and Curtis. Distrib. Malay peninsula to Borneo.

*Chisocheton*, sp. In fruit only. Lankawi Gunong Raya (Aniff).

*Carapa moluccensis*, Lam. Setul common in tidal rivers, attaining a very large size here. Distrib. Malay peninsula and islands.

#### CHAILLETIACEÆ.

*Chailletia Helferiana*, Kurz. Lankawi (Ridley 8314 Curtis 1687). Perlis, Chupeng Tongka (Curtis 2909). "Ganda Mahmot."

Distrib. Burmah and Tenasserim.

#### OLACINEÆ.

*Olar scandens*, Roxb. Kedah Alor Sta. Perlis, Kanga. Bangtaphan (Keith). A very pubescent form.

Distrib. India, Tenasserim, Java.

*Lepionurus sylvestus*, Bl. Perlis, Tebing Tinggi. Lankawi (Curtis).

Distrib. India to whole peninsula and archipelago.

#### ILICINEÆ.

*Ilex cymosa*, Bl. Lankawi (Curtis 246). Distrib. Malay peninsula and island.

#### CELASTRINEÆ.

*Microtropis filiformis*, King. Kedah, Alor Sta.

Distrib. Tenasserim to Perak.

*Pleurostylis Wightii*, W. and A. Lankawi (Curtis, 2664).

A fruiting specimen, but I think correctly identified.

Distrib. India.

*Gymnosporia Curtisii*, King. Lankawi Kwah; Pulau Tanjong sirih (Curtis) (2500). Bangtaphan on banks of streams. A tree 10 feet tall (Keith.) Perlis Bukit Lagi.

Endemic.

*Salacia flavescens*, var. *dumosa*. Lankawi, Kwah and Pulau Sirih (Curtis).

*S. polyantha*, Korth. Tongkah (Curtis). Lankawi, Kwah (Curtis 2574). Distrib. Borneo.

*S. viminea*, Wall? Lankawi (Curtis 2665). Distrib. Mergui, Tenasserim, Andamans.

*S. prinoides*, Dec. Kedah, Alor Sta. A bush (15455). Distrib. Indo-Malaya.

*Lophopetalum intermedium*, n. sp.

Tree 40 to 50 feet tall. Branches with black bark, branchlets angled, dilated and flattened at each node. Leaves opposite thinly coriaceous, elliptic base rounded, apex shortly acuminate obtuse, margins undulate, above drying greenish brown, beneath green, with reddish midrib, nerves 8 pairs 4-5 inches long  $1\frac{3}{4}$ - $1\frac{1}{2}$  inch wide, petiole  $\frac{1}{4}$  inch long. Panicles short about 2 inches long with few spreading angled branches. Bracts very small ovate subacute one-fourth of the length of the pedicel. Pedicel  $\frac{1}{8}$  inch long. Sepals connate very shortly free, lobes ovate glabrous. Petals 5 oblong rounded tip fimbriate white, with a transverse crest of processes near the base. Disc thick cushion-shaped with 5 stamens rising from the centre, filaments short fleshy, anthers ovoid acute. Ovary trigonous free from the disc, style short and thick.

Lankawi, Kesap (Aniff. Feb. 1911).

Near *L. oblongum*, King. of Penang, but the ovary is distinctly free from the disc and three angled connecting the genus with *Kokoona*.

*Lophopetalum pedunculatum*, n. sp.

Tree, leaves opposite subcoriaceous glabrous oblanceolate shortly cuspidate narrowed to the base 5 inches long 2 inches wide, nerves about 6 pairs little elevated, drying olive green above, yellow green beneath, petiole

hardly  $\frac{1}{8}$  inch long. Cymes axillary one from each leaf axil towards the ends of the branches. Peduncle  $1\frac{1}{2}$  inch long, bifurcating into 2 branches half-an-inch long, with a pair of lanceate fimbriate bracts at the bifurcation, and often a solitary peduncled flower in the fork. Cymules 2 on each branch of three flowers, with one solitary flower between the two. Bracts  $1\frac{1}{2}$  inch linear lanceolate fimbriate. Flowers  $\frac{1}{8}$  inch across. Calyx sepals orbicular, shorter than the petals. Petals 5 rounded orbicular ovate somewhat narrowed at the base margins shortly toothed. Stamens shortly protruding from the disc anthers very small Pistil, immersed in disc, style columnar narrowed slightly upwards, stigma capitate.

Perlis, Bukit Telor Jambu (15456).

Allied to *L. Scortechinii* King, but differing in the longer peduncles.

#### RHAMNEÆ.

*Zizyphus oenoplia*, Mill. Lankawi, Kwah (Curtis 8238) Perlis, Besih Hangat (15084).

Distrib. all Eastern tropics.

*Z. affinis*, Hemsl. Lankawi (Ridley).

Distrib. Peninsula.

*Colubrina asiatica*, Brngn. Lankawi, Kwah beach (Ridley) (15087).

Distrib. India to Singapore, and Islands.

*Gouania Javanica*, Miq. Perlis Roadsides, Kanga, (15089).

Distrib. whole Peninsula and Sumatra.

*Ventilago Maingayi*, Hook. fil. Lankawi, Pulau Segai (Aniff).

#### AMPELIDEÆ.

*Vitis barbata*, Wall. Terutau (Curtis, 2790) Bangtaphan (Keith). Distrib. Khasiya to Tenasserim.



*V. inlicita*, L. Kelah, Guno 13 Geriang (15090). Perlis, Besih Hangat. A handsome vine. Distrib. India.

*V. glaberrima* Lankawi (Curtis).

Distrib. whole Peninsula.

*V. discolor*, Dalz. Perlis, Besih Hangat. Setul. On limestone rocks. common.

Distrib. India, Cochin-China, Sumatra and Java, also in Perak (rare).

*V. mollissima*, Wall. Lankawi, (Curtis). Perlis, Besih Hangat, (15091).

This latter a very slender variety. Distrib. Peninsula.

*V. lanceolaria*, Wall. Perlis, Tebing Tinggi Distrib. India, Malay peninsula and Islands.

*Leca aequata*, L. Lankawi (Ridley, Curtis).

Distrib. Andamans, Malay peninsula, Java and Sumatra.

*L. rubra* Bl. Kedah, Alor Sta (Curtis). Banks of the Gunong Geriang river.

Distrib. Burmah, Bengal. Malay peninsula and Islands

*L. Sambucina*, Willd. Lankawi (Curtis).

Var. with small umbels as in *L. acuminata* but flowers white. Kedah at Alor Sta (15092).

Distrib. Eastern Tropics.

*L. robusta*, Roxb. Bangtaphan (Keith).

Distrib. India, Andamans and Singapore.

#### SAPINDACEÆ.

*Cardiospermum Halicacabum*, L. Bangtaphanoi. (Keith).  
Cosmopolitan. Chiefly carried about by natives.

*Erioglossum edule*, Bl. Lankawi, Kwah (Curtis). Perlis, Kanga (15089). Bangtaphanoi (Keith).

Var. with long leaves. Kedah, Alor Sta, (15088).

Distrib. Indo-Malaya to Australia.

*Mischocarpus sundaicus*, Bl. Setul.

Distrib. Assam, Burmah, Andamans to Singapore.

*Paranephelium muricatum*, Pierre. Perlis. Chupeng. A fair sized tree, in fruit, exactly resembling Pierre's figure, (15108).

Distrib. Cochin-China.

*Nephelium (Euphoria), pubescens*, n. sp.

Tree about 30 feet tall, shrubby erect. Branches and young parts closely densely hairy. Leaves equally pinnate with 4 pairs of leaflets 6 inches long, rachis closely pubescent with stellate hairs, leaflets alternate elliptic obtuse inequilateral, coriaceous 4 inches long by 2 inches wide or less above glabrous, except the midrib depressed hairy, beneath shortly hairy, thickly on the nerves, nerves about 10 pairs subhorizontal to near the margin, reticulations conspicuous, petiolule very short  $\frac{1}{10}$  inch long. Inflorescence 8-10 inches long, branches suberect, branchlets short with cymules of flowers crowded. All densely pubescent, except the flowers. Bracts lanceolate "white." Flowers very shortly sessile. Calyx lobes short lanceolate pubescent. Petals 5, elliptic oblong obtuse white glabrous more than twice as long as the sepals, scales at the base large oblong truncate connate pubescent. Stamens 8, glabrous as long as the petals style as long. Fruit (not ripe) oblong, covered with crowded processes over a quarter of an inch long densely pubescent.

Bangtaphan. A jungle tree, (Keith).

As far as the vegetative organs go, this seems to closely resemble Radlkofer's *Euphoria setosa*, Rec. Bot. Surv. India III 847, but it differs in the broad blunt glabrous petals with prominent scales at the base and glabrous stamens. *E. setosa*, is a native of Perak (No. 7677.) I have seen no specimen. From *E. malaiense*, the Mata Kuching t differs in its pubescence, larger flowers and fruit.

*Dodonea viscosa*, Jacq. Lankawi, Kwah (Curtis) (2847).

King gives this as occurring "in all the provinces, but usually planted." I have never seen or heard of its being planted. It always occurs on the sea shore in sand, and is very local. I have it only from the sea coast at Pekan in Pahang, Pulau Tinggi, off the east coast of Johor and the Dindings. Distrib. Indo-Malaya.

#### ANACARDIACEÆ.

*Buchanania florida*, Schauer. Lankawi (Curtis 2519). Kasum (Curtis 326).

Distrib. Burmah, Malay Peninsula, Sumatra.

*Anacardium occidentale*, L. Very common at Setul. This has run wild on all sandy coasts here.

*Gluta coarctata*, Hook. fil. Kedah river bank towards Gunong Geriang (15086).

Distrib. common in tidal rivers all over the peninsula.

*Mangifera foetida*, Lour. Bangtaphan (Keith)

*Mangifera pentandra*, Hook. fil.

Tree of fairly large size. Leaves lanceolate, oblong or obovate, narrowed to the base, apex acute or in full sized leaves rounded, stiffly coriaceous 6-7 inches long 3-4 inches wide, nerves 12 pairs. elevate beneath, petiole 2 inches long. Panicles large lax 6 inches to a foot long thickly velvety hairy, flowers in small tufts, cream white, tufts  $\frac{1}{4}$  inch across, sessile. Sepals 5, free grey hairy lanceolate obtuse. Petals oblong obtuse longer with three arms to the centre. Stamens nearly as long 5, filaments slender, anthers oblong. Disc lobed, fleshy. Ovary glabrous celled, seeded, style terminal.

Kedah, Alor Sta on the road to Bukit Pinang (15235). Distrib. Malacca.

From the description of the little known *Mangifera pentandra* I take it that this plant is what is intended. Hooker says it much resembles *M. indica* in leaf and inflorescence. I do not find it much resembles that. The leaves are very much larger and broader and when full sized rounded at the top.

*M. lanceolata*, n. sp.

Tree, leaves coriaceous, lanceolate obtuse, narrowed at the base, nerves 12 or 13 pairs, 5 inches long,  $1\frac{1}{2}$  inch wide, petiole 1 inch long, thickened at the base, narrowing upwards. Panicle 6 inches long, 5 inches across, rachis pubescent. Flowers small on pedicels as long as themselves,  $\frac{1}{2}$  inch long. Sepals, 5 ovate lanceolate pubescent, Petals twice as long linear oblong, obtuse white, keel half the length trifid at the tip, the central rib projecting subulate. Stamens fertile 3, 2 much smaller, apparently abortive. Disc lobulate attached to the stamens. Ovary papillose, style apical bent to one side. Fruit elliptic rather small with the style point persistent on the upper side below the tip; not ripe, but about an inch long.

Kedah, Alor Sta (15233).

This resembles *M. quadrifida* in habit but differs in its number of petals and sepals and stamens.

*Parishia rosea*, n. sp.

Large tree 50 to 60 feet tall, branches showing large conspicuous leafscars. Leaves a foot or more long, imparipinnate, leaflets ovate or oblong ovate base broadest rounded, minutely cordate, apex obtuse, sessile 4-4 $\frac{1}{2}$  inches long,  $2\frac{1}{2}$  inch wide glabrous, nerves 12 pairs, texture rather thin. Panicles from the upper axils long slender with lax branches 18 inches long. Flowers sessile  $1\frac{5}{8}$  inch long. Sepals 4 connate at the base oblong obtuse pubescent pink. Petals 4 little longer, white or pink oblong, apex rounded. Stamens 4 filaments, stout, narrowing upwards, anthers

ovate, as long as the pistil. Disc cup shaped, ovary conic, stigmas 2 subglobose bilobed. Young fruit with four linear oblong pubescent wings, much longer than the ovary.

Lankawi. Pulau Segai (Aniff. Feb. 1911).

Perhaps nearest to *P. insignis* but the leaflets are sessile, thin and glabrous, and the flowers quite different in structure. The bracts 2 to each flower are ovate, acute, pink and hairy.

*Parishia insignis*, Hook. fil. Lankawi, Kwah (Curtis 2806).

Distrib. Burmah, Andamans, Penang.

*Microstemon curtisii*, King. Lankawi by the Lake (Curtis 2620).

Endemic.

*Semecarpus Curtisii*, King. Setul on the northern road (15106). a fair sized tree; Puket, Flag Staff Hill (Curtis 2930).

Endemic. The fruit has not been described. It is oblique transversely elliptic an inch across when dry and half as long. The swollen peduncle cup-shaped half as long as the fruit.

*S. glomerulata*, Ridl. Perlis, Telor Jambu in fruit (15107). Lankawi, Pulau Niur Stali (Curtis).

The fruits are borne in a long panicle, as big as peas on rather long cup-shaped peduncles. Endemic.

#### CONNARACEÆ.

*Connarus semidecandrus*, Jack. Lankawi, Kwah (Curtis 2674).

Distrib. Whole Peninsula.

*C. gibbosus*, Wall. Lankawi, Kwah (Curtis 2905) Tongkah (Curtis 2905) common all over the island, Perlis, Chupeng (15152) Setul (15121)

*C. nicobaricus*, King. Bangtaphan and Bangtaphanoi. (Keith).

"Small jungle tree" Calyx pale green, corolla whitish with pinkish stigma. The panicles are shorter and broader than in King's description and the stamens are longer, as long as the petals, but I suppose this is the species intended. Distrib. Nicobars.

## LEGUMINOSÆ.

*Abrus precatorius*, L. Bangtaphan (Keith). Perlis, Kanga, Common. Distrib. Cosmopolitan in the tropics.

*A pulchellus*, Wall. Trang at Chong (native) Lankawi, Kwah (Aniff). Distrib. South Africa and South East Asia.

*Crotalaria Chinensis*, L. Setul, Distrib. India, China, Philippines, Malay Peninsula.

*C. retusa*, L. Bangtaphan (Keith). Cosmopolitan in the tropics.

*Cr. verrucosa*, L. Lankawi (Ridley). Bangtaphan (Keith). Distrib. India, and Malaya.

*Cr. saltiana*, Andr. (*C. striata* Dec.) Perlis, Chupeng, Bangtaphan (Keith). Distrib. India and Malaya.

*C. quinquefolia*, L. Perlis at Kanga. Distrib. India, Indo-China, Malay peninsula and islands.

*Flemingia congesta*, Roxb. Setul (15120). Bangtaphan (Keith). Perlis, Kanga. Distrib. India, Indo-China, Malay peninsula and islands.

*F. strobilifera*, Roxb. Perlis, Kanga common. Distrib. South East Asia.

*Dunbaria Scortechinii*, Prain. Perlis, Bukit Lagi. Bangtaphan (Keith).

Flowers yellow, keel green, outside of standard purple, the rest yellow (Keith). Distrib. Perak.

*Alysia crassa*, Prain. Perlis, Telor Jambu near Kanga. (15124)

Distrib. Andamans, India, Indo-China and Malay islands. Not found in the peninsula.

*Phascolus calcaratus*, Roxb. Perlis, Tebing Tinggi (15125). var. *gracilis*, Prain. Perlis, Kanga, (15126) Setul.

Distrib. Indo-Malaya.



*Teramnus labialis*, Spreng. Perlis, Kanga.

Distrib. Cosmopolitan, but only collected in the Malay peninsula by Wallich at Penang.

*Dioclea reflexa*, Hook fil. Perlis, Bukit Lagi and Tebing Tinggi (15128). A beautiful climber almost leafless at this time with abundant violet flowers.

Distrib. tropics of Africa and America, Andamans-Silhet, Malay Peninsula.

*Pueraria phaseoloides*, Benth. Lankawi (Ridley). Perlis, Chupeng (15127).

Distrib. Indo-Malaya.

*Mucuna biplicata*, Teysm. Lankawi, Kesap (Curtis).

Distrib. Malay peninsula and islands.

*M. gigantea*. Lankawi, Kwah (Curtis). Dec. Distrib. Malay peninsula and islands.

*Erythrina indica*, Lam. Kedah near Alor Sta and Gunong Geriang (15133).

Very fine big trees among the limestone rocks; probably wild here. I have not seen it wild elsewhere in the peninsula. Distrib. seashores of S. E. Asia.

*Erythrina atrosanguinea* n. sp.

A low tree, the branchlets thorny. Thorns acute with a broad base and a straight darker coloured point. Leaves deciduous during the flowering season, 6 inches long with three leaflets, leaflets ovate, obtuse, base rounded subcoriaceous, all equal and regular glabrous, the rachis and midrib on the back armed, nerves 8 pairs slender. 3 inches long 2 inches across, petiolules very small, stipels glandshaped. Raceme 8 inches, long woody glabrous, stout. Flowers numerous on short pedicels, nearly black about an inch long (hardly open). Calyx entire cupshaped with a short point pubescent half an inch long. Corolla short, 1 inch long, standard rather broad ovate, wings short

oblong linear. Stamens ten glabrous short, anthers linear oblong. Pistil pubescent, flattened stalked. Pods 6-7 inches long  $\frac{1}{2}$  inch wide, long beaked, torulose falcate with 4 or 5 seeds. Seeds cylindric oblong quite obtuse black  $\frac{1}{2}$  inch long. Lankawi on the sea shore at Kwah (Jan. 1897) Kedah common round Alor Sta (15135) Bukit Pinang (15134). This plant is remarkable for its deep red black short flowers.

*E. suberosa* Roxb. var ?

Specimens of an *Erythrina* consisting of branches covered with large thick conic thorns and a few flowers were obtained by Curtis at Terutau, and Dr. Keith at Bangtaphan. The latter describes his plant as an erect tree, the bark covered with big knotty spines, height 30 to 40 feet. The flowers appear before the leaves, and are  $1\frac{1}{2}$  inch long. Calyx spatheaceous not two lipped, but oblique and retuse, on the lower side pubescent. The standard is narrow "vermillion" much longer than broad entire at the tip, keel "golden," stamens grey.

This is referred to by King in the Materials as resembling in flowers *E. suberosa* Roxb., a glabrous form of which occurs in Tenasserim and Burma, but he points out that *E. suberosa* Roxb., has almost unarmed branches while this is in both specimens densely prickly.

*Indigofera Anil*, L. Perlis near Kanga, probably escaped from cultivation.

*I. sp.* Perlis, Besih Hangat.

In fruit only (15132).

*Sesbania cannabina*, Pers. Perlis, Kanga, (15123) Tongka (Curtis) Distrib. India, and Malaya.

*S. paludosa*, Roxb. Kedah (Kunstler) Distrib. India, China, Malay Peninsula and islands.

*Millettia atropurpurea*, Benth. Perlis, Kanga and between Juttra and Kanga: Lankawi, Kesap (Aniff). Flowers redder than usual. Distrib. Tenasserim, Malay Peninsula, Sumatra.

*Pongamia glabra*, Vent. Kedah, Gunong Geriang river bank. Perlis, Kanga. Lankawi, Kwah seashore, (Ridley, Curtis) Bangtaphan at McGregor Point (Keith.)

Distrib. Mascarene islands, Malay Peninsula and islands to N. Australia and Polynesia.

var. *xerocarpa*, Trang (Kunstler).

*Derris scandens*, Benth. Trang (Fox). Distrib. S. E. Asia to Australia.

*D. dalbergioides*, Bak. Setul, near Batu Bunga. A beautiful tree about 40 feet tall with violet flowers.

Distrib. Tenasserim, Martaban south to Malacca.

*D. uliginosa*, Benth. Kedah, Alor Sta, tidal rivers. Distrib. tidal rivers, East Africa to Polynesia.

*D. elliptica*, Benth. Perlis, Tebing Tinggi. Pungah (Curtis).

Wild here I think climbing over limestone rocks but often planted by Chinese.

*D. malaccensis*, Prain. Bangtaphan (Keith) Distrib. Tenasserim to Borneo.

*D. sp.*

Climber with large leaflets and oblong slightly winged pods. Setul, Batu Bunga.

*Dalbergia tamarindifolia*, Lankawi, Kwah (Curtis).

Distrib. Assam to Malay peninsula and islands.

*D. velutina* var. *typica*, Lankawi, Kwah (Curtis).

Distrib. Assam to Malay Peninsula.

*Dalbergia torta*, Grah. Lankawi (Curtis).

Distrib. India, Burmah, Malaya, China.

*Smithia sensitiva*, Ait. Perlis, dry paddy field edges at Kanga, (15121). Distrib. Africa and S. E. Asia.

*Geissaspis cristata*, W. and A. Kedah, Alor Sta ; Perlis, Kanga (15122) Dry rice fields. Flowers yellow. Absent from the peninsula. Distrib. India to Tenasserim.

*Aeschynomene indica*, L. Perlis, Kanga, Tropics generally.

*Uraria crinita*, Desv. Setul. A compact dwarf form with branched stem on sandy heaths (15118).

Distrib. India, Indo-China, China, whole peninsula and Archipelago.

*U. lagopoides*, Dec. Perlis, Besih Hangat, Tebing Tinggi (15119). Flowers white.

Distrib. same as the last, but rare in the peninsula occurring in Perak, Pahang and Prov. Wellesley.

*Alysicarpus vaginalis* var *nummularifolius* Perlis, Kanga.

var. *typica*, A much more showy plant with white flowers. Damp grassy fields near the village, Kanga (15156).

*Desmodium triflorum*, Dec. Perlis, Kanga (15136) Bangtaphan (Keith). Cosmopolitan.

*D. heterophyllum*, Dec. Setul. Distrib. Tropical Asia.

var. with very small leaves and fruit covered with long silky hairs, with some long red ones at the base. Setul Heaths.

*D. pulchellum*, Benth. Kedah, Alor Sta (15137). Tongka (Curtis) Distrib. Indo-Malaya.

*D. umbellatum*, Dec. Perlis, Kanga, Bangtaphan (Keith) Tongka (Curtis) Distrib. Shores of tropical Asia.

*D. rugosum*, Prain. Lankawi (Curtis). Distrib. Tenasserim.

*D. capitatum*, Dec. Perlis, Bukit Lagi (15142) Kanga.

Distrib. Indo-Malaya.

*D. polycarpum*, Dec. Setul, Bukit Rajah Wang (15143). Perlis, Telor Jambu.

var. *rigidum*, a woody strict plant about three feet tall. Leaflets three stiff coriaceous, lanceolate, base rounded, apex slightly narrowed, blunt 3 inches long,  $\frac{3}{4}$  inch wide, or less glabrous shining above covered beneath with long appressed hairs giving it a glaucous appearance. Racemes terminal strict 6 to 8 inches long hairy. Fruits half-an-inch long shortly hairy, Kedah, Alor Sta (15147) Lankawi (Curtis) and Penang, Ayer Hitam (Curtis 459) sub. var. *minor*. A small form with leaflets coriaceous like the last variety, but oblong obtuse  $\frac{3}{4}$  to 1 inch long distinctly reticulated, branches with appressed silky hairs. Racemes  $1\frac{1}{4}$  inch long slender. A dwarf-form from the Setul heaths (15148).

Both of these seem to be xerophytic forms of the common plant.

*D. ovalifolium*, Wall. *D. polycarpum*, var. *ovalifolium*, Prain. Kedah, Bukit Pinang, near Alor Sta (15144) and Gunong Geriang. Common in the peninsula.

I should hold this to be specifically distinct from *D. polycarpum* on account of its persistent prostrate creeping habit and its pale lavender white flowers.

*D. gangeticum*, Dec. Kedah, Gunong Geriang (15137) Perlis Tebing Tinggi (15138). Setul (15139). Trang at Chong (Native collector). Shrubby with yellow flowers.

Distrib. Nicobars and Penang.

*D. triquetrum*, Roxb. Setul. Kedah on Bukit Pinang, at Alor Sta (15141). Perlis, Kanga (15140) Distrib. Indo-Malaya, absent from the peninsula.

*D. latifolium*, Dec. Trang at Chong (Native collector) Bangtaphan (Keith). Distrib. Africa, Indo-Malaya Siam, absent from the peninsula. This resembles *D. gangeticum*, Dec. but its flowers are pink

*Sophora tomentosa*, L. Lankawi, Kwala Malacca, Burau (Curtis, Ridley).

Distrib. most tropical countries, absent from the Malay Peninsula except in the Dindings. A sand-hills shrub.

*Cassia fistula*, L. Bangtaphan (Keith.) Distrib. India.

*C. obtusifolia*, L. Perlis, Tebing Tinggi, Kanga. Now cosmopolitan.

*C. timoriensis*, Dec. Kedah, Gunong Geriang. Perlis, Telor Jambu, Chupeng. Lankawi, Kwah (Curtis). Distrib. Indo-Malaya and China.

*C. siamea*, Lam. Road between Alor Sta, and Perlis.

Distrib. Indo-Malaya and Indo-China.

*Bauhinia mollissima*, Wall. Perlis, Besih Hangat, Kanga; Kasum (Curtis). Bangtaphan (Keith). Trang at Chong (Native).

Distrib. Tenasserim, Malay peninsula and Islands.

*B. Curtisii*, Prain. Terutau (Curtis, 1682) and Lankawi near the lake, (2619). Endemic.

*B. integrifolia*, Roxb. Tongkah (Aniff). Distrib. Malay peninsula very common, and Sumatra.

*B. micrantha*, n. sp.

A long climber over rocks and bushes. Leaves red when young, adult bright green, ovate, apex bilobed, lobes rounded, base broad, not cordate, nerves 10, glabrous except a little red hair at the base, and young leaves red silky, 2 inches long  $2\frac{1}{2}$  inches wide, cleft at tip  $\frac{1}{4}$  inch long, petiole  $\frac{1}{2}$ - $\frac{3}{4}$  inch long usually glabrous. Raceme on a peduncle 2 inches long, rachis elongating to an inch or so red hairy. Flowers numerous corymbosely arranged small, white, pedicel slender half-an-inch pubescent. Calyx, tube as long thicker, lobes ovate short. Corolla lobes clawed  $\frac{1}{4}$  inch long oblong rounded, crisped, white, pubescent on the claw. Stamens longer glabrous. Ovary shorter, glabrous. Tendrils short.



Perlis, Bukit Lagi, to the top, Chupeng open country abundant.

Allied to *B. Wrayii*, Prain, but differing in the lobed leaves with more nerves and a different form.

*Cynometra ramiflora* var *mimosoides*, Bak. Tree, by the road to the North, 2 miles from Setul.

Distrib. Andamans and Malabar and Ceylon.

*Crudia speciosa*, Prain. Punga (Curtis). Endemic.

*C. Curtisii*, Prain. Lankawi, Gunong Raya (Aniff). Distrib Penang.

*Peltophorum ferrugineum*, Benth. Terutau (Curtis 370).

Distrib. Malay peninsula and Islands.

*P. dasyrhachis*, Kurz. Trang (Kunstler).

Distrib. whole peninsula and Sumatra.

*Coesalpinia nuga*, Ait. Perlis near Kanga. Terutau (Curtis).

Distrib. S. E. Asia, Australia and Polynesia.

*C. digyna*, Rottl. Lankawi (Curtis). Perlis, Besih Hangat (15131). Tongka (Curtis 2862). A very troublesome thorny climber.

Distrib. India, Indo-China, Malay islands, also in Penang.

*Adenanthera pavonina*, L. Lankawi (Curtis). Tongka (Curtis).

Distrib. S. East Asia.

*Neptunia oleracea*, Lour. Bangtaphan (Keith). A terrestrial form appearing in rice-fields after the crop.

*Acacia pennata*, Willd. Lankawi, Kwah, (Curtis). Perlis, common at Kanga (15129). The common form in the Malay peninsula

var. *arrophula* Perlis, Chupeng (15130).

Distrib. India, Indo-China and Andamans.

*A. farnesiana*, Willd. Perlis, Kanga.

*Albizzia myriophylla*, Benth. Terutau (Curtis).

Distrib. Indo-Malaya.

*A. lebbek*, Benth. Perlis, several trees near Kanga, in open country. Bangtaphan (Keith).

I do not know whether this is wild here.

#### ROSACEÆ.

*Parinarium griffithianum*, Benth.

Perlis, Kanga (15214) Lankawi, Gunong Raya (Aniff.)

Distrib. Malay peninsula, and Islands.

*Parinarium nitidum*, Hook. fil. Setul.

*Pygeum persimile*, Kurz. Trang (Aniff.)

Distrib. Malay peninsula.

#### SAXIFRAGACEÆ.

*Polyosma integrifolia*, Bl. Kopah (Fox.) Lankawi, Gunong Raya (Aniff.) Tree 20-30 feet, flowers white.

Distrib. India, Malay peninsula, Andamans.

#### DROSERACEÆ.

*Drosera Burmanni*, Vahl. Common on the heaths, Setul.

Distrib. West Africa, India, China, Japan, Australia. Not common in the peninsula, sandy heaths of Pahang and on Mount Ophir.

*D. indica*, L. Flowers rose pink. Langkawi (Curtis 2099) Setul heath and old paddy fields.

Distrib. of the last, but rarer in the Peninsula.

#### RHIZOPHOREÆ.

*Rhizophora conjugata*, L. Setul, common.

*Bruguiera Gymnorhiza*, Lam. Bangtaphan, Keith.

*B. eriopetala*, Wight. Langkawi, Pulau Segai (Aniff.)

*Ceriops Candolleana*, Arn. Bangtaphan, Keith.

Probably all the common species of *Rhizophoraceæ* occur in this region but no others have been collected or recorded.

*Carallia lucida*, Roxb. Langkawi, Kwah (Ridley, 2435): Perlis, Bukit Lagi.

Distrib. East Asia to Australia.

#### COMBRETACEÆ.

*Terminalia bialata*, Steud. Perlis, Kanga and Chupeng, In fruit. Trang at Chong, (flowers).

Distrib. Burmah, Andamans and Nicobars.

*T. Catappa*, L. Langkawi, common on the sea coast at Kwala Malacca and elsewhere.

*Calycopteris floribunda*, Lam. Trang (Kunstler).

Distrib. India, Andamans, Penang.

*Lumnitzera coccinea*, W. A. Langkawi, Kwah.

*Combretum trifoliatum*, Vent. Perlis, Besih. Hangat. Trang (Kunstler).

The Perlis plant was not a climber, but a sturdy bush.

Distrib. India, Java.

*Quisqualis indica*, L. Perlis, Chupeng.

Distrib. Burmah, Malay peninsula and Islands. Certainly wild on limestone rocks.

#### MYRTACEÆ.

*Bocckia frutescens*, L. Singgora sea shore (St. V. B. Down.)

Distrib. Malaya.

*Decaspermum paniculatum*, Kurz. Perlis, Chupeng (15041).

Distrib. Indo-Malaya.

var. *glabrum* Lankawi, Gunong Raya at 1000 feet (Aniff.)

*Rhodamnia trinervia*, Bl. Perlis, Chupeng. Setul.

Distrib. Burmah, Malaya, Australia.

*Melaleuca leucadendron*, L. Perlis near Kanga, Setul very abundant (15045) Lankawi Kwah (Curtis.)

This tree forms a forest in wet grassy heaths along the borders of rivers.

Distrib. India, Malaya, Australia.

*Rhodomyrtus tomentosa*, Wight. Setul, very common.

Distrib. South India, Malaya.

*Eugenia grandis*, Wight. Perlis, Chupeng. Setul heaths. Lankawi, Kwah (Curtis) and Kwala Malacca.

Distrib. Burmah, Assam, Malay Peninsula.

*E. lineata*, Duthie. Kedah, Alor Sta; Lankawi. Burau,

Distrib. Malaya.

*E. Scortechinii*, King. Tongka (Fox. Ridley, 12601). Lankawi, Gunong Raya 1500 feet alt (Aniff.)

*E. grata*, Wight. Lankawi (Curtis) Kwala Kwah (Aniff.)

Distrib. Andamans, Malay peninsula, Sumatra.

*E. inophylla*, Roxb. Lankawi (Curtis 2621.)

Distrib. Indo-Malaya.

var. with lanceolate long acuminate leaves, Setul. Rajah Wang. This may be specifically distinct.

*E. claviflora*, var *leptantha*, Perlis, Bukit Lagi.

Distrib. Malay Peninsula.

*E. pseudo-subtilis*, King. Kedah, Bukit Pinang. Perlis, Telor Jambu, Distrib. Malay peninsula.

*E. polyantha*, Wight. var. with more rounded leaves than usual and very small flowers in lax cymes. Kedah, Alor Sta.

*Barringtonia racemosa*, Roxb. Lankawi (Curtis 2676) Setul, Muddy forest near the river at Bukit Rajah Wang. (15048). Distrib. Indo-Malaya.

*B. macrostachya*, Kurz. Kedah Bukit Pinang, Alor Sta. Lankawi, Burau, Kwala Malacca.

Distrib. Burmah and Malaya.

*B. acutangula*, Gaertn, Kopah (Fox.) Distrib. India.

*B. spicata*, Bl. Kedah, Gunong Geriang (15047) River bank, Setul (15048) Trang (Kunstler.)

Distrib. Malay Peninsula and islands.

*Careya arborea*, Common on open heath country, Perlis, Kanga. Setul. Lankawi (Ridley) said here to have been introduced, native name "Putat Kedong."

#### MELASTOMACEÆ.

*Osbeckia chinensis*, L. Setul (W. Fox.) Distrib. India, China, Malay islands, absent from the peninsula.

*O. cochinchinensis* var. Setul, heaths and pastures.

This pretty little plant I take to be that intended by Cogniaux by his description in the *Melastomaceæ*, Decandolle's Prodrômus p 331. It is an annual from 2 to 7 inches tall, simple in small forms, branched often much in larger ones. Stems reddish four angled, the leaves are not sessile as Cogniaux gives but very shortly, but distinctly petioled. The flowers are mostly crowded together in a head, rose pink about  $\frac{1}{4}$  inch across. The stamens purple half as long as the petal, oblong obtuse with a short yellow connective process. In the ripe fruit the processes of the calyx disappear and the bristles are seen to be arranged on longitudinal ridges, as they are in the *O. zeylanica*.

*Melastoma malabathricum*, var. *appressum*, Setul heaths.

A very showy form of *M. Malabathricum* with larger flowers than usual occurred at Chupeng in Perlis.

*Melastoma schizocarpa*, n. sp.

Shrub about six feet tall branched, branches terete, above reddish sprinkled thickly with long red acuminate hairs. Leaves lanceolate, acute, subcoriaceous, 5 nerved, above shining glabrous, beneath glabrous except for some adpressed hairs on the midrib and side nerves, 4 inches long, 2 inches wide, petiole half-an-inch long, red, covered with long slender hairs, acuminate over  $\frac{1}{2}$  inch long. Flowers terminal two or three shortly peduncled  $1\frac{1}{2}$  inch across. Bracts ovate cuspidate with a long point about  $\frac{1}{2}$  inch long, hairy. Calyx tube urceolate  $\frac{3}{4}$  inch long, densely hairy with long glistening hairs with a dilated base, lobes 5, very short toothlike. Petals bright rose colour, an inch long obovate rounded. Stamens 10, larger filaments,  $\frac{1}{4}$  inch long to the articulation, connective above longer prolonged into two short linear truncate, yellow processes. Anther cells undulate, acuminate, yellow  $\frac{1}{2}$  inch long; smaller one third as long as the large stamens. Style rather stout, glabrous. Fruit  $\frac{3}{4}$  inch long on a peduncle,  $\frac{1}{4}$  inch long, dull red densely covered with long hairs, and crowned with the short ovate calyx lobes, dehiscing along one side for the whole length. Seeds irregularly ovate, triangular, pale fawn colour densely, minutely punctate. Perlis, heathy country at Ginting Kabok.

A very handsome plant with large flowers remarkable for its glabrous leaves, and its longitudinal dehiscence.

*Sonerila epilobioides*, Stapf. Terutau (Curtis 2114). Small Islands of Lankawi (Curtis 3680). Endemic.

*S. congesta*, Stapf. Lankawi, Gunong Chin-Chang (Curtis 2572). Endemic.

*S. muscicola*, Stapf. Langkawi, Gunong Raya (Curtis 2572). Endemic.

*Memecylon edule* var. *ovata*, Clarke. Lankawi, Kesap and Kwah (Curtis 2572).

Distrib. Indo-Malaya.

*M. myrsinoides*, Bl. Perlis, Ginting Kabok. Distrib. Malaya.

*M. caeruleum*, Jack. Kedah, road side at Bukit Pinang near Alor Sta (15057). Distrib. Malaya.

*M. oleaefolium*, Bl. Lankawi, Sungei Batu Asap.

A tree 20 to 30 feet with blue berries (Aniff). Distrib. Malaya.

*M. amplexicaule*, var. Lankawi, Gunong Raya (Aniff). Inflorescence more laxly paniced than usual Distrib. Malaya.

*Pternandra paniculata*. Lankawi, Sungei Batu Asap (Aniff). Distrib. Malaya.

#### LYTHRACEÆ.

*Ammannia peploides*, Spreng. Perlis, rice-fields near Ginting Kabok. Distrib. India, China, Persia and Andamans.

*A. baccifera*, L. Kedah, swamps at the base of Gunong Geriang, abundant. Distrib. Indo-Malaya.

*A. rotundifolia*, Ham. Lankawi, swamps at Kwah (Ridley 8293). Distrib. India, China and Formosa.

*Crypteronia paniculata*, Bl. Kedah, Bukit Pinang near Alor Sta. Perlis, Chupeng; Lankawi (Aniff).

Distrib. Burmah, Khasia, Andamans to Penang and Perak.

*Lagerstroemia floribunda*, Jack. Very common all over this region, Kedah, Alor Sta, Perlis, Kanga. Trang at Chong (Native). Lankawi (Curtis). Distrib. Burmah, Siam, China, Malay peninsula.

*Duabanga sonneratioides*, Ham. Setul.

Distrib. Burmah, East Himalayas, Malay peninsula South to Perak.



SAMYDACEÆ.

*Homalium Griffithianum*, Kurz.

Lankawi? Tanjong Sirih, (Curtis 2506). Trang  
(Kunstler) Perlis, Kanga. Distrib. Tenasserim.

PASSIFLOREÆ.

*Passiflora foetida*: Perlis, Kanga.

Introduced from South America, now spread over the  
whole peninsula.

*Adenia nicobarica*, King.

Lankawi (Curtis 2542) Setul, climbing on the bamboos  
on the heath. Bangtaphan (Keith.)

A very small slender plant with very narrow leaves  
and fruit, very different looking from the Perak plant.

Distrib. India, Malay peninsula.

BEGONIACEÆ.

*Begonia (Platycentrum) Curtisii* n. sp.

Tuberous, stem erect, succulent red, leafy 2 to 8 inches  
tall glabrous. Leaves very variable in shape and colour.  
Ovate unequally cordate oblique obtuse to ovate, lanceo-  
late, acuminate, 2-3 inches long,  $1\frac{1}{2}$  to 2 inches wide, dark  
green to brown plain or spotted with silver glabrous.  
Petiole  $1-2\frac{1}{4}$  inch long spreading. Flowers in lax terminal  
cymes occasionally axillary. Bracts ovate caducous, white  
veined red. Pedicels short red. Male flowers  $\frac{3}{4}$  inch  
across. Perianth, lobes 4-2 large oblong or orbicular  
oblong, 2 oblong linear all blunt, white or tinted with pink.  
Stamens numerous short crowded, connective not produ-  
ced. Female flowers with 4 or 5 lobes, 3 oblong or  
subspathulate, one or more linear oblong. Styles 2, nearly  
free, branched and twisted. Fruit  $\frac{1}{4}$  inch long, 3 winged,  
one wing obtusely triangular half-an-inch long.

Kasum, abundant and very variable in colour and marking of leaves, on limestone rocks (Curtis No. 3234). This plant has fairly large tubers and dies completely down in the dry season. It seems to be nearest to *B. integrifolia* Dalz and *B. guttata* Wall.

*B. sinuata* Wall. A small plant of this came up in a pot with plants from Lankawi in the Singapore Botanic Gardens in 1892. It was rather an odd form as the leaves were quite round and hardly cordate and nearly entire, but I have no doubt that it is this peninsula plant. It also grows at Telayah Tujoh, Burau.

*B. praeclara* King. Lankawi (Curtis) this also occurs in the Telom Valley, see the account of this plant in the Flora of Telom and Batang Padang valley.

#### CUCURBITACEÆ.

*Trichosanthes laciniata*, n. sp.

A slender climber, leaves ovate, cordate, trilobed, very variable, from ovate to lanceolate has serrate in outline margins, toothed above, scabrid with white pustules, beneath roughly hairy on the nerves, 1 inch to  $1\frac{1}{4}$  long, 1 inch or more wide. Tendrils simple, long and slender. Inflorescence 3 inches long, bracts, narrow palmate base long cuneate, apex with several 5 or more long teeth; half an inch long. Flowers solitary in the bracts white, pedicel  $\frac{1}{8}$  inch long hairy. Corolla tube  $\frac{3}{4}$  inch long hairy, limb 1 inch across white glabrous, salver shaped. Fruit ovate oblong  $\frac{3}{4}$  inch long pubescent, ribbed; seed  $\frac{1}{4}$  inch long, oblong rounded at both ends, keeled and somewhat rugose.

Lankawi at Kwah (Curtis. Ridley 8350).

Allied to *Tr. bracteata* but with curiously lacinate hand shaped bracts. The young parts of the plant are pubescent.

*Gymnopetalum cochinchinense*, Kurz. Lankawi (Curtis 2599).  
Distrib. Indo-Malaya, China.

*Alsomitra clavigera*, Roem. Lankawi, Tanjong Sirih (Curtis  
2504) Pulau Langon (same No.) and near Kwah (Ridley).  
Distrib. India.

FICOIDEÆ.

*Mollugo pentaphylla*, L. Common at Setul.  
Distrib. South East Asia.

UMBELLIFERÆ.

*Eryngium foetidum*, L. Bangtaphanoi (Keith). Said to have  
been introduced to the Peninsula by Chinese who culti-  
vate it.

ARALIACEÆ.

*Aralia armata*, Seem. Lankawi at Kwah (Curtis 2526).  
Distrib. India and Burmah.

*Heptapleurum ellipticum*, Seem. Lankawi, Kwah and Terutau  
(Curtis) Perlis at Kanga in a large fig tree opposite the  
Residency. Fruit yellow, petioles longer than usual and  
leaflets more coriaceous.

Distrib. Malay peninsula, Sumatra.

RUBIACEÆ.

*Mitragyna parvifolia*, Korth. A tree nearly bare of leaves  
with a few rather old heads of fruit appears to belong to  
this species. Heath, Setul (15020). Distrib. India to  
Burmah.

*Nauclea peduncularis*, Don. Kopah (W. Fox). Distrib. Malay  
peninsula to Borneo.

*Adina rubescens*, Hemsl. A small leaved form from the Telayah  
Tujoh, Burau, Lankawi.

*Uncaria Roxburghiana*, Korth. Bangtaphan (Keith).

Distrib. Malaya.

*U. lanosa* var. *parviflora*, A small flowered form; the capitula fully expanded only half to three quarters of an inch through; the corolla tube one quarter of an inch long to nearly half an inch long, hairy. In the Penang form the corollas are glabrous and considerably longer. Scandent over bushes. Perlis, Chupeng (15019).

Distrib. of species Penang and Perak.

*Argostemma pictum*, Wall. Lankawi (Curtis). Distrib. as far south as Malacca.

*Hedyotis capitellata*, Wall. Bangtaphanoi (Keith), Kasum (Curtis). Common all over the peninsula and islands.

*H. glabra*, R. Br. Perlis, Chupeng, (15018).

Distrib. India, Penang and Malacca.

*H. congesta*, Br: var. *nicobarica*, Perlis at Ginting Kabok, (15016).

Distrib. of species whole peninsula, variety Nicobars.

*H. connata*, Wall. Langkawi (Curtis), Burau (Ridley), Perlis, Tebing Tinggi. Bangtaphan (Keith).

Distrib. Burmah to Perak.

*H. pinifolia*, Wall. Sandy places, Lankawi (Curtis), Setul (15015). Distrib. India to whole Peninsula.

*H. hispida*, Retz. Bangtaphan (Keith). Distrib. India, Penang and Perak.

*Hedyotis stelligera* n. sp.

Herb with 4-angled stems about 2 feet tall, branched, shortly, roughly hairy. Leaves subcoriaceous, lanceolate, acuminate, acute, nearly sessile, glabrescent above in adults, beneath thickly hairy with short hairs, midrib and prominent nerves densely hairy with longer ones,  $1\frac{1}{2}$  inch long,  $\frac{1}{2}$  inch wide, primary nerves 2 pairs ascending very straight, stipules ovate, cuspidate hairy. Flowers in dense

globose heads, axillary and terminal  $\frac{1}{4}$  inch through sessile densely hairy. Bracts lanceolate hairy. Calyx  $\frac{1}{10}$  inch long, lobes 4 as long as tube linear, covered with pale multicellular hairs, bright green, corolla white, twice as long dilated upwards glabrous, except the lobes, lobes 4 short ovate lipped with long white hairs. Stamens 4 anthers oblong white, filaments attached to the mouth of the tube. Style filiform. Capsule urnshaped, crowned with the spreading calyx lobes, hairy,  $\frac{1}{8}$  inch long. Seeds flat, thin, black, deeply pitted.

Setul Heaths abundant in sandy spots.

Nearest perhaps to *H. peduncularis* King of Kedah Peak, but the heads are actually sessile. The calyx lobes with long hairs spread out flat after flowering, like stars, hence its specific name.

*Oldenlandia rosea*, n. sp.

An erect tufted herb, 10 inches big, much branched, stem and branches 4-angled, sprinkled with long scanty hairs, branchlets verticelled, terminal ones cymose, slender. Leaves ovate or oblong ovate, half an inch long,  $\frac{1}{4}$  inch wide, sub-coriaceous, hairy, narrowed to the petiole at the base, apex sub-acute, petiole  $1\frac{1}{2}$  inch long; upper leaves narrower and smaller. Flowers cymose small, glabrous, pedicels  $\frac{1}{8}$  inch long. Calyx tube funnel-shaped, not winged, lobes 4 ovate, acute, hairy. Corolla tube longer than the sepals, lobes 4 nearly as long lanceolate, acute, all rose pink. Stamens 4, protruded beyond the tube filaments filiform, free to the base, anthers oblong. Style as long as the petals, stigma entire club-shaped papillose. Capsule  $\frac{1}{10}$  inch long sub-globose, obscurely lobed, crowned with the sepals, pale, sparingly hairy, tip flattened, two celled. Seeds numerous angled black. Setul Heaths, (15466).

Near *O. dichotoma*, but more bushy with rose pink, not violet flowers. The flowers are just the colour of those of *Erythroea Centaurium*.

*O. nudicaulis*, Roth. Lankawi (Curtis 2669)

Distrib. India, Malacca, Java, Philippines.

*O. paniculata*, L. Perlis, Kanga (15014) Bangtaphan (Keith).

Not at all common in the peninsula. Distrib. Indo-Malaya to Polynesia.

*O. dichotoma* Hook. fil. Sandy spots Setul (15013.)

Distrib. Malay peninsula. Easily recognized when alive by its charming little violet flowers.

*O. diffusa*, Roxb. Setul. Kedah, Alor Sta in dry rice-fields, (15012) Distrib. Tropical Asia.

*Ophiorrhiza tomentosa*, Jack. Kedah, Bukit Pinang, Alor Sta (14988). Lankawi, Kwah (Ridley), Kassum (Curtis 3257), Bangtaphan (Keith).

Distrib. Penang and Perak.

*O. Kunstleri*, King. Lankawi (Curtis). Setul, Rajah Wang (14987) Bangtaphan (Keith 396). "Very common everywhere in jungle where damp, corolla teeth slightly purple" (Keith).

I suppose this is the plant intended by *O. Kunstleri* King. It is rather larger in leaf usually and the flowers are covered with distinctly yellow hair.

Distrib. Perak.

*Mussaenda villosa*, Wall. var. *Herveyana*. Lankawi, Kwah (Curtis 2521). Perlis, Chupeng, Bangtaphanoi (Keith).

This variety is much the commonest in the peninsula.

Distrib. Malay peninsula.

*Randia dumetorum*, Lam. var. *pubescens*. Lankawi, Kwah (Curtis). Burau bay (Ridley). Perlis, Kanga (15007).

A shrub, flowers at first white, soon orange coloured. I have it also from Pekan, Pahang.

Distrib. India, Java, Sumatra and Perak.

*R. Forbesii*, King and Gamble. Lankawi (Curtis).

Distrib. Malay peninsula, Islands and Andamans.

*R. densiflora*, Benth. Lankawi (Curtis 2609).

A form with very large leaves, 6 inches long and 3 inches wide also occurs here. Distrib. Malaya.

*R. fasciculata*, Dec. Perlis, Chupeng (15007). Setul, Bukit Rajah Wang (15008). Bangtaphan (Keith). Distrib. Indo-Malaya.

var. *parviflora*. Lankawi, Kwah (Curtis 2549).

*R. longiflora*, Lam. Lankawi, Kwah (Ridley).

Distrib. Malay peninsula and Borneo, common.

*R. exaltata*, Griff. Bangtaphan (Keith). A tree 60 feet tall, occurs also in Penang.

Distrib. Burmah, Andamans and Penang.

*R. impressinervis*, King. Bangtaphan (Keith).

Distrib. Malay peninsula and Borneo.

*R. penangiana*, King. var. with small round leaves.

Lankawi, low country (Aniff).

*R. pauciflora*, n. sp. *R. longiflora*, var. *Major* King.

Climber with the thorns short hooked like those of *R. longiflora*. Leaves elliptic, acuminate, narrowed a little at the base, 4 to 5 inches long,  $1\frac{1}{4}$  to 2 inches wide, thinly coriaceous, dark coloured when dry, glabrous, nerves 5 pairs, petiole  $\frac{1}{4}$  inch long. Stipules short broad, truncate with a straight edge. Cymes of three flowers axillary. Peduncle under  $\frac{1}{4}$  inch. Pedicels longer. Bracts ovate, calyx broad funnel-shaped, lobes short ovate over  $\frac{1}{4}$  inch long. Corolla tube  $1\frac{1}{2}$  inch long, moderately stout, limb  $\frac{3}{4}$  to  $1\frac{1}{4}$  inch across, lobes 6 obovate. Stamens not apiculate, partly exsert. Pungah (Curtis).

This seems to me very distinct from the common *R. longiflora*, Lam., to which King refers it as a variety.



✓ *Randia uncata*, n. sp.

= *Oxygonos* ~~uncata~~ *uncata*  
Shrub 10 to 20 feet erect, armed with stout curved hooked spines,  $\frac{1}{4}$  inch long in pairs from axils. Leaves coriaceous, oblong to oblong lanceolate 4 inches long, 1 inch wide, glabrous, nerves 8 pairs, apex obtuse, base slightly narrowed, petiole  $\frac{1}{4}$  inch. Cyme compound short dense sessile, terminal 1 inch long, and  $1\frac{1}{2}$  inch wide. Bracts persistent ovate, acute, amplexicaul  $\frac{1}{2}$  inch long, Pedicels about as long. Flowers yellowish white fragrant, Calyx goblet-shaped narrowed into pedicel with 5 short acute lobes,  $\frac{1}{2}$  inch long. Corolla tube cylindric, short, thick, hairy within lobes elliptic oblong obtuse  $\frac{1}{2}$  inch long. Stamens 5 shorter, linear oblong, yellow, eventually reflexed. Style stout fusiform, fruit not seen.

Bangtaphan in clearings (Keith).

The claws are brown corky at the base with a white polished tip. The stipules free, ovate cuspidate.

*R. (Ceriscus) dasycarpa* (Kurz) *R. tomentosa*, Hook. fil. (not of Blume).

On heaths Setul (15066), and Bangtaphanoi on the sea-beach (Keith).

All the descriptions of this plant, I have seen are very incomplete, but I have little doubt that my identification is that of the plant intended. A fuller description will however, be perhaps of use.

It is a large spreading shrub about 12 to 18 feet tall, strongly armed with stout axillary spines, 2 inches long, straight and horizontal. Bark grey with rounded lenticels. Young parts red scurfy. Leaves appearing after the flowers, spatulate, apex rounded, base acuminate, coriaceous  $1\frac{1}{4}$  inch long,  $\frac{3}{4}$  inch wide, above dark green velvety, beneath densely covered with soft close white hairs, nerves 10 pairs, depressed above elevate beneath. Flowers on short thick peduncles with ovate red hairy persistent bracts, pedicels short,  $\frac{1}{4}$  inch long, a cup-shaped circle of

ovate connate hairy, bracts below the calyx. Calyx green woolly (when dry ferrugineous) and gummy, cylindric with 8 subulate teeth,  $\frac{5}{8}$  inch long, as long as the corolla tube. Corolla white densely appressed hairy, lobes 8, oblong obtuse, hairy outside glabrous within, a ring of hairs within the tube. Stamens 8 adnate to the mouth of the corolla tube, anthers linear extruded. Fruit as large as and resembling a pomegranate, 3 inches through globose, brown velvety, crowned by the calyx tube,  $\frac{1}{2}$  inch long, ending in irregular points, 2 celled. Seeds numerous ovoid  $\frac{1}{4}$  inch long, dark brown, slightly flattened, imbedded in a bitter pulp.

Keith gives petals 10, stamens 10, sepals 5 with 5 smaller ones between, but all his specimens have the parts in eights. The flowers perhaps, vary in the number of parts. He describes the fruit as 1-celled, yellow green, hard apple looking. It so closely resembles a pomegranate, that the plant collector took it for one.

In the Flora of British India this is given as a synonym of *Gardenia tomentosa* Bl. mss. in Dec. Prod. IV. 379, the description of which is "*inermis*, ramulis foliis, calycibusque velutino-tomentosis, foliis obovato-cuneatis floribus terminalibus sessilibus solitariis, *calycis tubo angulato et costato* dentibus 10 subulatis brevibus, corollae lobi 10 obovato-oblongi, tubus vix calyce longior" I have italicised the points in which the Setul plant differs, and as they are rather important ones prefer to retain Kurz's *Gardenia dasycarpa* name till it is certain that the Java plant collected by Blume is identical.

→ *Gardenia Campanula* Ridl; *G. Godefroyana*, Kunze.

Perlis at Kanga in open country, (15009.) Some plants had larger leaves than usual lanceolate and rather broad, as much as six inches long.

This plant was originally collected by me on the Pahang river (not Penang as given in the Materials) distributed under the number 1311, and described in the

transactions of the Linnean Society Vol. III p. 310, which description was overlooked by Kunze, and King and Gamble.

Distrib. Indo China, Cambodia and Cochin China.

*Petunga Roxburghii*, Dec. Perlis, Besih Hangat, (15010).

A compact bush, spikes short.

Distrib. Northern India, Burma, Java, Sumatra Borneo.

*Timonius*, n. sp.

In Curtis, Lankawi collections, I have two specimens of a *Timonius* (No. 2544) which evidently belong to an undescribed species but unfortunately possess no flowers or fruit. The twigs are slender and dark and when young covered as are the shoots and nerves of the leaf with rather long red hairs. The leaves are lanceolate, acuminate 3-4 inches long,  $\frac{1}{2}$  to  $1\frac{1}{4}$  inch wide, rather thin in texture with short hairs sprinkled over the upper surface, especially on the ribs, beneath the nerves are more prominent, thickly covered with close appressed red hairs, the petiole  $\frac{1}{4}$ - $\frac{1}{2}$  inch long, also densely hairy.

King has written on the sheet of this "probably a form of *T. Rumphii*," but I can hardly think it can be that. I know no form of *T. Rumphii* at all like it. It would be advisable to get fully complete specimens before naming it as a distinct species.

*Diplospora malaccensis*, var. Lankawi, Sungei Batu Asap (Aniff). The leaves are thinner than usual. I found this also at Burau, as a shrub, with red berries. It is possibly a distinct species, but I have not seen flowers.

Distrib. of species Malay peninsula.

*Canthium parvifolium*, Roxb. Setul Heaths, (15006) Lankawi common at Buran.

Distrib. India, Malay peninsula, Java.

*C. glabrum*, Bl. Kasum and Tongkah (Curtis). Distrib. Tenasserim, Andamans, Malay peninsula. Java, Borneo.

*C. aciculatum*, Ridl. Kedah at Gunong Geriang (15005).

Distrib. Perak at Lenggong on limestone rocks.

*C. didymum*, Gaertn. A small leaved form. Lankawi at Kwah (Curtis 2131) and Tanjong Sirih (Curtis 2607) and Burau. Distrib. Tropical Asia.

A fair sized tree with bright green flowers.

*Vangueria grisea*. *Canthium griseum*, King and Gamble.

A medium-sized tree or large shrub, armed in the Perlis plant with long straight spines. The adult leaves are quite glabrous. The fruit is sub-globose borne on long slender pedicels an inch long. It is crowned with the four ovate sepals and is four celled, hence it must be referred to the genus *Vangueria*. King and Gamble point out its resemblance to *V. spinosa*. The plant is nearly leafless when in flower. The flowers are bright light green. I retain unwillingly the specific name, as there is nothing grey about the plant except its young leaves when dry.

Kedah, Alor Sta, (149004), in the pastures, Perlis, Kanga (149003) Lankawi, Kwah (Curtis).

The genus distributed over the tropics of the old world is absent from the Malay peninsula.

*Webera stellulata*, Hook. fil. Perlis, Kanga (14996.)

Distrib. Malay Peninsula.

*W. Curtisii*, King. Lankawi islands, and Terutau (Curtis).

A small leaved form occurs on the top of the limestone rocks at Gua Batu in Selangor and in Perak.

*W. corymbosa*, Willd. var. A tree 50 feet tall, stems 4 angled, white. Leaves 8 inches long, 4 inches wide. Bangtaphan (Keith).

*Ixora Brunonis*, Wall. Lankawi (Curtis). Bangtaphan (Keith).

Distrib. Burma to Perak.

*I. merguensis*, Hook. fil. Pungah (Curtis). Distrib. Mergui. var *Curtisi*. Pungah (Curtis) foot of the hills.

*I. multibracteata*, Pearson. Lankawi at Kwah (Curtis). Perlis Ginting Kabok, Besih Hangat and other places near Kanga (14999). Pungah (Curtis).

Distrib. Andamans, Kedah and Perak.

The flowers are white. A large bush almost a tree.

*Ixora Keithii*, n. sp.

A shrub six feet tall. Leaves thinly coriaceous, shining light green, when dry oblong, shortly narrowed at both ends, 6 inches long,  $2\frac{1}{2}$  inches wide, petiole  $\frac{1}{8}$  inch long, nerves numerous, fine. Stipules as long as the petiole cylindric with a mucro. Cyme with 2 small leaves at the base, branches 3, 2 inches long, brachiate, covered with short rough hairs, pedicels longer than the calyx. Calyx globose hairy, teeth long, lanceolate acute, hairy, shorter than the tube. Corolla tube dull pink, an inch long pubescent lobes 4 or 5 narrow linear oblong white flushed with rose,  $\frac{1}{8}$  inch long glabrous stamens, anthers narrow linear. Style shorter than the petals clubbed, arms at length spreading.

Bangtaphan (Keith 339.) In tropical forest April 26th, 1890.

Allied to *I. cuneifolia* but longer corolla tube and more and finer nerves to the leaf.

*Ixora plumea*, n. sp.

Shrub about ten feet tall, glabrous, drying black, leaves oblanceolate, acuminate or elliptic acuminate, narrowed at the base, thinly coriaceous, nerves 8 pairs slender 4-5 inches long, 2 inches wide, petiole  $\frac{1}{4}$  inch long.

Stipules broadly ovate with a long cusp. Compound cyme terminal lax, 3 inches long, and 5 inches wide of three main branches, minutely and sparingly covered with small hairs. Bracts very narrow, linear acuminate,  $\frac{1}{8}$  inch long. Bracteoles half as long, flowers very shortly pedicelled, pedicels pubescent. Calyx short lobes very narrow linear subulate, longer than the short rounded tube. Corolla slender white, half an inch long, tube twice as long as the lobes, straight glabrous, lobes twisted in bud, lanceolate acute 4. Stamens exsert, filaments slender. Anthers linear acute rather long. Style exsert slender, stigmas 2 linear. Fruit globose,  $\frac{1}{4}$  inch long, crowned with the persistent sepals, 1 more rarely 2 seeded.

Perlis woods at the limestone rocks at Telor Jambu near Kanga. Setul woods at Bukit Rajah Wang, Bangtaphan, Keith.

A very pretty shrub with hanging branches of white flowers so slender and light, that they have quite a feathery appearance. Dr. Keith, whose plant has broader leaves 6 inches long by  $2\frac{1}{2}$  inches wide, describes it as a reclining shrub with grey bark, 25 feet long, calyx purple, corolla white fragrant.

*I. arguta*, Br. Lankawi (Ridley, 8299). Perlis, Ginting Kabok (14995). Distrib. Malay peninsula.

*I. opaca*, Br. Perlis, Chupeng; Kopah (W. Fox), Gunong Toxai in Tongkah (Curtis, 2931), Lankawi, Gunong Raya at 1500 feet (Aniff). Distrib. Malaya.

*I. pendula*, Jack. Lankawi, common in the Malay peninsula.

*I. Lobbii*, London. Kasum (Curtis). Distrib. Malay peninsula.

*I. grandifolia*, Zoll. Lankawi, Gunong Raya (Aniff.)

*I. stricta*, Roxb. Lankawi (Ridley 8354, Curtis 2607) Perlis, Ginting Kabok (14997), Setul on the heath 14998, Bangtaphan (Keith).

Distrib. India, Burmah and the whole peninsula.

*I. clerodendron*, Ridl. Bangtaphan (Keith) also occurs in Pahang.

*Pavetta naucleiflora*, Wall. Lankawi, Gunong, Chin-Chang.

Distrib. India, Burmah, south to Perak.

*P. indica*, L. var. *polyantha*, Perlis, Chupeng (14994); Telubin (Down), Bangtaphan (Keith.)

var. *tomentosa*, Lankawi at Prigi Tujoh, Burau (Ridley). A large shrub.

Distrib. of species Indo-Malaya, common.

*Prismatomeris albidiflora*, Thw. Very common over this region in dry spots.

Kedah, Bukit Pinang, near Alor Sta, (15001) Perlis, Chupeng (15000), Setul heaths (15002).

In none of my specimens are the corolla lobes as long as the tube, but half as long or less, one shorter flowered form (15000) has the tube hairy within. A charming shrub with its deliciously fragrant white flowers. Distrib. India, Ceylon, Malay peninsula and Islands.

*Psychotria polycarpa*, Hook. fil. Kasum (Curtis), Bangtaphanoi Macgregor's point and Bangtaphan (Keith). Distrib. Malay peninsula and Java.

*P. sarmentoides*, Val. Lankawi on rocks and trees at Burau Distrib. Malaya.

*P. angulata*, Korth. Kedah, Alor Sta, (14989). Perlis, Chupeng, (14990) Lankawi.

Distrib. Burma, Malaya.

*P. viridiflora*, Reinw. Tring (Wray) (fide King). No specimen seen. Possibly an error for Trong in Perak.



Distrib. Burmah south to Malacca, Java, Sumatra, Borneo.

*P. stipulacea*, Wall. Trang (Kunstler).

Distrib. Malay peninsula and Sumatra.

*P. Curtisii*, King and Gamble. Kedah, Gunong Geriang; Lankawi, Kwah (Curtis), Perlis, Ginting Kabok (14991) Bangtaphan (Keith). Distrib. Penang.

The Lankawi plant is hairy on the leaves, the other specimens glabrescent. The cyme is much more spread out in the Perlis and Kedah plants, but I think all are forms of the species.

*Psychotria siamensis*, n. sp. Erect shrub, branches woody, smooth. Leaves coriaceous, lanceolate, acuminate shortly, or not at tip, base narrowed glabrous, drying light green above, grey beneath, shining above, beneath scurfy pale, nerves 11-12 pairs conspicuous on both surfaces, elevate beneath, midrib prominent,  $4\frac{1}{2}$  inches long,  $1\frac{3}{4}$  inch wide, petiole thick,  $\frac{1}{4}$  inch long. Stipules connate into a tube with two shorter sub-triangular blunt points, soon deciduous. Panicle dense elongate, 2 inches long with very short branches, flowers small, numerous, crowded, drying black. Pedicels very short calyx cup-shaped, almost entire with five small points. Corolla twice as long, tube short cylindrical, lobes ovate, acute, half as long 5, mouth of tube full of white hairs, stamens exsert, anthers linear, oblong, obtuse. Fruit globose, small,  $\frac{1}{8}$  inch long or fully ripe oblong narrowed at the base faintly six ribbed.

Setul heaths (15096) Lankawi (Curtis, 2631).

This plant has the form and colouring of the leaves as in *Ps. Griffithii*, but is remarkable for the inflorescence being spicate in form and not umbellate as in most other *Psychotrias*, consisting of a 2 inch rachis elongating to 4 inches in fruit, with crowded short cymes on short peduncles.

*P. Griffithii*, var. A narrow leaved form with distinctly keeled stipules, and the inflorescence quite glabrous, except for a tuft of ferruginous hairs at the base of the branches. Lankawi woods in Burau bay; common in the south of the peninsula.

*Spermacoce hispida*, L. Setul (15011).

Distrib. India, China, Malaya.

*S. scaberrima*, Bl. Heaths Setul (15017). Distrib. Malaya.

*Paederia foetida*, L. Kedah, Alor Sta, hedges (14993). Lankawi, Kwah (Aniff). Tongkah (Aniff. Distrib. Ridley 12561).

Distrib. India, Malaya, Andamans.

*P. tomentosa*, var. *subglabra*, Perlis, Bukit Lagi, on limestone rocks. Fruit small, shining yellow, plant foetid.

Distrib. Malaya.

*Saprosma indicum*, Dalz. Perlis, Ginting Kabok (14992).

Distrib. India and Ceylon.

*S. consimile*, Kurz. Lankawi, Sungei Machang (Aniff).

Distrib. Burmah.

*Geophila reniformis*, Don. Punga, Kasum (Curtis. 3235.)

Distrib. tropics of both worlds.

*Chasalia curviflora*, Thw. Setul, common on the heath. Typical form, but more compact and dwarfed, than the low country one. Lankawi, Burau etc.

Distrib. Malaya, common in every part of the peninsula.

#### COMPOSITÆ.

*Vernonia eleagnifolia*, Dec. Hedges at Alor Sta (Kedah). Bangtaphan (Keith). Perlis, Kanga.

Distrib. Pahang, East coast. Singapore, Pongol, (possibly not wild in this spot,) Burmah.

- V. cinerea*, Less. Perlis, Kanga. Trang at Chong. Distrib. Cosmopolitan.
- V. Curtisii*, Craib. (Kew Bulletin 1910. I. 22) Lankawi, Terutau and other islands (Curtis 2127-3260.) Endemic.
- V. chinensis*, Less. Perlis, Kanga. Distrib. Malaya.
- Elephantopus scaber*, L. Perlis, Kanga, Ginting Kabok. generally.
- Adenostemma viscosum*, Forst. Perlis, Chupeng. Tropics generally.
- Ageratum conyzoides*, L. Bangtaphan (Keith). Perlis, Kanga.
- Blumea balsamifera*, Dec. Bangtaphan (Keith). Perlis near Kanga. Distrib. Indo-Malaya.
- Bl. lacera*, Dec. Perlis, Kanga. Distrib. Tropical Africa and Asia.
- B. membranacea*, Dec. Lankawi (Ridley). Perlis, Telor Jambu, near Kanga. Bangtaphan (Keith).
- var. tall and stout much branched and much more hairy than the ordinary form. The involucre bracts villous, the receptacle and achenes glabrous, flowers yellow.
- Rice fields near Kanga, Perlis, (14901). Distrib. Indo Malaya.
- Bl. myriocephala*, Dec. Bangtaphan in jungle, plant 3 feet tall, (Keith). Distrib. India and Malaya.
- Pluchea indica*, Less. Tidal rivers, Perlis, Kanga. Distrib. tropical Asia.
- Sphoeranthus africanus*, L. Rice fields and pastures, Kedah near Gunong Geriang; Setul, and Bangtaphan (Keith).
- Distrib. Old world tropics.
- Emilia sonchifolia*, Dec. Perlis, Kanga. Distrib. Indo-Malaya.
- Gynura sarmientosa*, Dec. Lankawi, Kwah (Curtis.)
- Distrib. Siam and Malaya.

*G. pseudochina*, var.

A tall plant with the stem, leaf on both sides and involucre bracts, covered with pale scabrid hairs. Bracts green, flowers rich yellow,  $2\frac{1}{2}$  feet tall, achenes glabrous, Pappus white, Bangtaphanoi on the beach (Keith).

This plant has a tall stem, leafy throughout, and has much the habit of *G. bicolor*. It closely resembles the common Malay plant which I take to be *G. pseudochina* but is hairy with thin hairs all over. The common plant is nearly glabrous. It differs from the typical *G. pseudochina* in its tall leafy stem and non-tuberous roots. These *Gynuras* have been very much confused. The numbers quoted under *G. bicolor* Dec. in the Materials belong to two quite distinct plants, and neither resembles the figure of *Cucalia bicolor* Bot. Reg. 110.

*Eclipta erecta*, L. Common in ricefields and waste ground. Perlis Kanga. Bangtaphan (Keith). Distrib. tropics generally.

*Wedelia biflora*, Dec. Perlis, Tebing Tinggi, common in all tidal swamps.

*Spilanthes acmella*, L. Common in waste ground, Perlis, Kanga. Bangtaphan (Keith).

*Bidens pilosa*, L. Lankawi, Kwah sea shore.

*Centipeda orbicularis*, Lour. Perlis, ricefields near Kanga. Setul pastures.

Some of the Setul plants were very large making a mat a foot across with a large taproot. Distrib. Indo-China and Malay peninsula.

*Grangea maderaspatana*, Poir. Kedah, in ricefields near Gunong Geriang. Flowers yellow, not known from the peninsula. Distrib. India.

*Synedrella nodiflora*, Gaertn. Perlis, Kanga, a common weed all over the peninsula.

*Crepis japonica*, Benth. Perlis, Kanga. Distrib. East Indies.  
*Erigeron linifolius*, Willd. Bangtaphan (Keith) a common  
 weed everywhere in cultivated ground.

STYLIDIEÆ.

*Stylidium tenellum*, Sw. Setul in pastures. Flowers bright  
 mauve. Distrib. Bengal, Burmah, south to Malacca.

GOODENOVIEÆ.

*Scaevola Koenigii*, Vahl. Bangtaphan, (Keith).  
 Distrib. sea coasts of tropical Asia and Polynesia.

CAMPANULACEÆ.

*Lobelia Griffithii*, Hook. fil. Perlis, Chupeng. Bangtaphan  
 (Keith). The description is very short, but the plant  
 appears to be this species. Dr. Keith describes it as 3 to  
 12 inches tall flowers, sky blue, anthers light, blue, style  
 dark-blue, stem triangular.

Distrib. Burmah, Tavoy, Mergui.

*Sphenoclea zeylanica*, Gaertn. Kedah, Alor Sta by the river.

Rare in the peninsula, Province Wellesley and  
 Malacca. Distribution, tropical regions of both hemis-  
 pheres.

MYRSINEÆ.

*Moesa ramentacea*, Wall. Lankawi, Kwah, (Curtis), Perlis  
 Chupeng, and near Kanga in hedges, (14937).

This is a somewhat distinct form from the common  
 species with much more conspicuous white flowers.  
 Distrib. India and Malaya.

*Myrsine umbellulata*, A. Dec. Setul (14936).

Distrib. Singapore near the sea, at Krangi and  
 Chua Chukang, and Sumatra and Borneo.

*Embelia Ribes* Burm, Lankawi (Curtis).

Distrib. India and Malaya.

*Ardisia fulva*, King and Gamble. Lankawi, Kwah, (Curtis, Ridley).

Distrib. Penang hill and the Dindings.

*A. lankawiensis*, King and Gamble.

Lankawi woods opposite Kwah (Ridley, 8313), Endemic.

*A. colorata*, Roxb. var. *salicifolia*, Kopah, (Fox), Kedah, Bukit Pinang near Alor, Sta (14933).

*Ardisia furva*, n. sp.

Shrub, leaves lanceolate, entire, narrowed at both ends gradually, apex acute, glabrous above, beneath slightly rufous, hairy in the midrib, densely dotted with glands beneath, nerves in conspicuous, about 20 pairs of primary, secondaries nearly as prominent,  $4\frac{1}{2}$  inches long by  $1\frac{1}{2}$  inch wide, petiole half an inch long, red pubescent. Cymes in the axils of the upper leaves pubescent  $1\frac{1}{2}$  inch long, Peduncle 1 inch, pedicels about six, half an inch long, Calyx lobes rounded, ovate, pubescent edges ciliate. Corolla lobes longer,  $\frac{1}{8}$  inch ovate, lanceolate, obtuse glabrous, dotted with glands in the upper half. Stamens hastate mucronate base bilobed, broad with glands on the back, filaments shorter, broad. Style narrowed upwards. Fruit globose, unripe.

Trang at Chong (Native collector).

Allied to *A. fulva*, King and Gamble, but glabrescent calyx nor glandular not villous, anthers not acuminate, leaves entire. The leaves dry red brown, as in *A. fulva*.

*A. sanguinolenta*, Wall. Perlis, Telor Jambu hill (14932).

Distrib. Burma. I am not sure of this species of which I have seen no specimen and my plant was only in fruit.

*A. oxyphylla*, Wall. A small tree, the leaves with fewer nerves than usual. In fruit only. Setul near Batu Bunga. (14931.)

*A. pendula*, Mez. Perlis on Bukit Lagi, Kanga. In fruit (14935). I have collected this also in Temerloh, Pahang. and have it from Panchur in Malacca. It seems to be a rare plant here.

Distrib. Java and Sumatra.

*A. crenata*, Roxb. Setul on the sandy heaths, a stunted form, (14934) Lankawi (Aniff). Distrib. Assam, Burmah, Malaya, China, and Japan.

*A. solanacea* Roxb. Lankawi, Kwah (Curtis).

Distrib. India, Burmah, and Malay peninsula.

*A. villosa*, Roxb. Trang at Chong (Native)

Distrib. Malay peninsula, (common) Archipelago, Tonkin, and Hainan.

*Aegiceras majus*, Gaertn. Setul. Distrib. Indo-Malaya to Australia.

#### SAPOTACEÆ.

*Sideroxylon ferrugineum*, Hook. fil. Lankawi (Curtis), Setul heath (14924).

Distrib. Burmah, Andamans, and Nicobars, the Malay peninsula and islands to the Phillippines and South China. Usually near the sea.

*Payena Leerii*, Benth. and Hook. Lankawi by the lake (Ridley 8329). Distrib. Malay peninsula and islands.

*Palaquium Clarkeanum*, Hook. fil. Lankawi, Gunong Raya by the Sungei Batu Asap stream at 2000 feet alt. Getah menjatoh (Aniff).

The scantiness of *Sapotaceæ* seems remarkable but they appear to be almost as rare in the Tenasserim and Mergui districts, though very abundant in the Western peninsula of India and the Malay peninsula.



## EBENACEÆ.

*Maba olivacea*, King and Gamble. Lankawi (Curtis).

Distrib. Perak.

*M. buxifolia* Pers. Lankawi, Kwah, (Curtis) 2557. var, with larger leaves, Perlis, Kanga (14914)

Distrib. Tropical Africa and Indo-Malaya.

*Diospyros clavigera*, Clarke. Lankawi at Kwah. (Curtis, 3418, Ridley) Kedah on Bukit Pinang at Alor Sta (14923).

A narrower leaved form. Perlis common at Kanga. A plant found at Chupeng (14922), differed in its much larger leaves, pubescent on the back. The lobes of the calyx were three or four on different parts of the same plant. I doubt if *Maba merguensis* Hiern is a different plant. Native name "Komoi."

Distrib. Malay peninsula.

*D. dumosa*, King and Gamble. Tonka, Gunong Toxai (Curtis).

Distrib. Perak.

*D. Curtisii*, King and Gamble. Perlis, Tebing Tinggi (14916). (The specimens are in young flower) but I think they are this species; Pungah (Curtis 2942), Endemic.

*D. oblonga*, Wall. Lankawi, Kwah (Curtis). Distrib. Malay peninsula

*D. Wallichii*, King and Gamble. Lankawi (Ridley, Curtis). Kōpah (Aniff). Distrib. Malay peninsula.

*D. Helferii*, Clarke. Lankawi, Kwah (Ridley 8237, Curtis); Perlis, Kanga (14920-14915), Tebing Tinggi (14917), very common in the ricefields and woods. Distrib. Malacca, Tenasserim.

*D. sapotoides*, Kurz. Lankawi, Kwah, and near the lake (Curtis, 3783, 2595)

All the specimens are female and this sex is but poorly described. I believe this is the plant intended by Kurz.

It has oblong leaves with a broad base, and acute tip, coriaceous and drying black, glabrous except the shoots and young leaves which are silky. The flowers are sessile, solitary, axillary. The calyx is cup shaped with four short lobes. The fruit globose, three quarters of inch through glabrous except some long appressed red hairs at the base. The calyx half an inch deep, the lobes 4, short, recurved at the tip, covered outside with short hairs, within with longer appressed red ones.

*D. embryopteris*, L. Tongka. (Curtis). Lankawi, Kesap (Aniff).

#### OLEACEÆ.

*Olea puberula*, n. sp.

Tree, bark white, thickly lenticellate, leaves opposite, lanceolate, acute, or elliptic lanceolate, glabrous, pale beneath, shining above, thinly coriaceous, nerves 6-7 pairs, midrib depressed above, elevate beneath, 4 inches long,  $1\frac{1}{2}$  inch across or less, margins entire. Panicles terminal, 2 inches long, dense; rachis branchlets, etc., pubescent, bracts small, lanceolate, oblong, persistent. Flowers in small cymose tufts, nearly sessile,  $\frac{1}{8}$  inch long. Calyx cup-shaped, lobes ovate, very short, pubescent. Corolla tube half as long again minutely pubescent, lobes 5, thick oblong with a rounded tip, not in pairs. Stamens 2, as long as the petals minutely pubescent, Fruit panicle, larger, pubescent. Drupes  $\frac{1}{4}$  inch long, black, glabrous, oblong with a short terminal style.

Perlis Chupeng (15223).

A very distinct *Olea* on account of its pubescence.

*O. dentata*, Wall. Kopah (Md. Aniff).

Distrib. Burmah to Penang.

*O. maritima*, Wall. Perlis at Chupeng (14933). Distrib. common in the Malay peninsula and islands in sandy spots near the sea.

*Jasminum Mainyayi*, Clarke. Perlis, Ginting Kabok.

Distrib. Malay peninsula, Penang and Perak, Borneo.

*J. decussatum*, Wall. Kedah, Alor Sta, Bukit Pinang (1493I), Perlis, Kanga, Setul, Kasum (Curtis), Trang (King's collector).

A very common, softly grey pubescent jasmine with small flowers. The fruits and carpels are usually in pairs not single as described in the Materials. Distrib. Burnah.

*J. bifarium*, var. *glabrum*. Tongka near Puket and at Kasum (Curtis) Distrib. whole peninsula, Java.

#### APOCYNACEÆ.

*Willughbeia martabanica*, Wall. Setul, Kopah (Fox).

Distrib. Burma to Pahang.

*W. firma*, Bl. Lankawi (Curtis). Distrib. whole peninsula, and Borneo, and Sumatra.

*Alyxia lucida*, Wall. Lankawi, Gunong Raya (Curtis, 2547).

Distrib. whole peninsula, Borneo, and Sumatra.

*Rauwolfia perakensis*, King and Gamble. Limestone rocks at Gunong Geriang, Kedah, (14948). Bangtaphan (Keith).

A shrub about 6 or 7 feet tall here, and shedding its leaves, before flowering.

*R. densiflora*, Benth. Bangtaphan (Keith). Distrib. India.

*Hunteria corymbosa*, Lankawi, Kwah (Curtis, 237).

Distrib. Peninsula as far south as Selangor, India, Cylon, Borneo, and Sumatra.

*Cerbera lactaria*, Gaertn. Lankawi (Curtis). Bangtaphan (Keith), Setul. Distrib. Indo-Malaya.

*Alstonia Curtisii*, King and Gamble. Kasum. Limestone rocks (Curtis). Endemic.

*Kopsia*, sp. Punga (Curtis No. 2937). A small tree, flowers white, resembles *K. fruticosa* A. Dec. but the flowers are larger and not pink, and it is a tree.

*Holarrhena*. This genus consists of about eight known species natives of Africa and Indo-China. The one Indian species *H. antidysenterica*, is recorded for the Malay peninsula from a specimen obtained at Malacca by Captain Wight, in Wight's Icones. As the plant has never again been seen anywhere in the peninsula it was probably collected in a garden.

*H. Curtisii*, King and Gamble, collected at Trang by Curtis. March 1895 (No. 3392) resembles most my *H. pulcherrima*, but differs in its larger flowers and hairy leaves.

*H. pulcherrima*, n. sp.

A shrub three or four feet tall, much branched, almost entirely glabrous, stems smooth, brown. Leaves rather strict coriaceous lanceolate, acuminate, acute, base slightly narrowed, 4 inches long,  $\frac{3}{4}$  inch wide, shining above, paler beneath, quite glabrous, nerves fine, 7-8 pairs ascending, meeting in long loops near the margins, reticulations distinct. Cymes terminal lax, about 14 flowered, 2 inches long, 3 inches wide. Bracts linear, narrow, margins fringed with rather long scattered hairs,  $\frac{1}{4}$  inch long, upper ones shorter. Flowers white, fragrant, shortly (nearly  $\frac{1}{4}$  inch) pedicelled, pedicels and branches of cyme glabrous. Calyx split nearly to the base, lobes linear, bright green, margined with cilia, nearly  $\frac{1}{4}$  inch long. Corolla tube slender,  $\frac{3}{4}$  inch long, enlarged at the base, pubescent within, and without lobes as long  $\frac{1}{4}$  inch wide, oblong obtuse, narrowed at the base, glabrous inside minutely pubescent outside. Stamens very small, lanceolate, mucronulate, filament half as long as the anthers, ovary conoid glabrous, style short longer than the ovary thick, stigma conic blunt. Follicles  $7\frac{1}{2}$  inches long, linear,

acuminate, black,  $\frac{3}{8}$  inch through, seeds linear, oblong pale,  $\frac{1}{4}$  inch long, channelled on the inner surface, rounded on the back, coma  $1\frac{1}{2}$  inch long, silky, pale buff.

Perlis, Kanga (14982), Chupeng (14981), Setul heaths. A beautiful fragrant plant forming quite a tall bush in the damper spots near Chupeng, more dwarfed on the Setul heaths.

*H. latifolia*, n. sp.

A shrub 8 to 10 feet tall, glabrous except the young parts. Leaves broadly ovate, almost orbicular ovate, or elliptic, ovate, shortly subacute or obtuse, base rounded,  $4-4\frac{1}{2}$  inches long by  $2\frac{1}{2}-3\frac{3}{4}$  inch wide, above sprinkled with short scattered white hairs, beneath more densely hairy, especially on the nerves, nerves elevate beneath 14 pairs, sub-horizontal, straight, bifurcating before the edge, petiole very short,  $\frac{1}{10}$  inch long, hairy. Corymb terminal, many flowered, dense, 2 inches long and wide, very hairy. Bracts linear hairy,  $\frac{1}{8}$  inch across. Calyx green, split to near the base campanulate lobes 5, linear, acute;  $\frac{1}{8}$  inch long, very hairy. Corolla tube nearly 1 inch long, greenish, hairy, lobes oblong, rounded at the tip,  $\frac{1}{2}$  inch long, nearly  $\frac{1}{4}$  inch wide, when dry pubescent on both surfaces, pure white, tube, dilated at the base. Stamens very small, mucronate, filaments half as long as the anther. Carpels separate, glabrous.

Bangtaphan. In clearings, (Keith 19.3.90).

*H. densiflora*, n. sp.

Shrub  $1\frac{1}{2}$  to 2 feet tall, stems sparingly pubescent above, black. Leaves obovate to elliptic or subspathulate, nearly sessile, apex rounded, occasionally retuse or with a very short point, gradually narrowed towards the base, coriaceous, above minutely hairy, beneath paler densely hairy, nerves 12 or 13 curved, meeting in loops near the edge, 2-3 inches long.  $1-1\frac{1}{4}$  inch wide, petiole thickened

$\frac{1}{8}$  inch or less. Flowers very numerous, crowded in one terminal head of ten with another in the uppermost axil, compound cymose. Cymes 1-2 inches long, branches hairy. Bracts linear obtuse,  $\frac{1}{4}$  inch long, Calyx  $\frac{1}{8}$  inch long, lobes linear, free nearly to the base, hairy, green. Corolla white tube, half an inch long, slightly dilated at the base, hairy, green, lobes oblong, slightly narrowed towards the base, obtuse,  $\frac{1}{4}$  inch long, minutely pubescent on the outside, glabrous within. Stamens very small, anthers lanceolate, minutely mucronate, filament nearly as long, Carpels glabrous, style rather long considerably longer than the carpels cylindric, "Pod 2-3 inches long."

Bangtaphan (Keith) in fields and clearings, very abundant in dry places. Between Singgora and Nong-chik, common in sandy plains (St. V. B. Down).

There are also three specimens in Cantley's collection No. 2746, without any locality except Singapore from which they could not have come.

This species is allied to *H. latifolia*, but differs in its smaller size and the shape and size of the leaves. In this plant they are somewhat variable but there is all through a tendency to become spatulate, the upper end of the leaf being broader than the lower one. They vary much on the same specimen, some are obovate, some almost spatulate, the tip varying from retuse to rounded and to slightly pointed.

*H. pauciflora*, n. sp.

A dwarf shrub about 3 feet tall with a few slender black stems, glabrous. Leaves lanceolate or oblong lanceolate, glabrous, coriaceous, nearly sessile, 1 to 3 inches long,  $\frac{3}{8}$ - $\frac{3}{4}$  inch wide, nerves 5 pairs but often hardly visible, reticulations not marked, margin revolute when dry, petiole  $\frac{1}{10}$  inch long thick. Flowers solitary in pairs in the upper axils, on pubescent pedicels,  $\frac{1}{8}$  inch

long. Calyx lobes free, nearly to base, lanceolate, acuminate  $\frac{1}{8}$  inch long. Corolla tube  $\frac{3}{4}$  inch long. glabrous, dilated about the middle into a fusiform swelling, limb over an inch across, lobed shortly only about half way, lobes ovate. All pure white, glabrous. Anthers lanceolate,  $\frac{1}{10}$  inch long, hardly mucronate. Follicles terete, acuminate, 6 inches long,  $\frac{1}{4}$  inch through when split. Coma silky buff coloured 1 inch long. Seed  $\frac{1}{4}$  inch long, pale brown indented on one side, rounded on the other.

Perlis Ginting Kabok on sandy heaths (14980), Kopah (W. Fox), (Ridl 2610). Ban Aor to Nongchick..... (St. V. B. Down 9/6/06).

This pretty fragrant plant differs much from the other *Holarrhenas* in its corolla limb being less deeply cleft, and its thick tube. The stamens are larger and nearly sessile about half way up the tube. There is a short process above the anther cells.

*Ervatamia coronaria*, Stapf. Kasum, (Curtis), said to be wild in India, but seems to have run wild in sandy places everywhere now.

*E. peduncularis*, Wall. Lankawi (Curtis, 2536).

Distrib. Malay peninsula.

*Parsonsia spiralis*, Wall. Lankawi, Kwah, (Curtis), Kasum (Curtis). Distrib. Burmah, Indo-Malaya, China.

*Wrightia javanica*, A. Dec. Kedah, Bukit Pinang (14950 and 14951); Perlis Chupeng (14952); Tongkah (Curtis 3054). Flowers white.

Distrib. as far South as Province Wellesley, Java.

*W. laevis*, Hook. fil. Punga (Curtis 2943). Distrib. Malay peninsula and Sumatra.

*W. dubia*, Spr. Tongka, Puket (Curtis), Trang (Kunstler).

Distrib. Penang, Prov. Wellesley, Sumatra.



This is extremely unlike any other *Wrightia* and seems intermediate between this genus and *Strophanthus*. It only differs from that genus in its short, blunt, entire coronal processes, and if not kept in *Strophanthus* might be better placed in its old genus *Cameraria*. The flower is cherry pink within, withering scarlet, outside whitish flesh colour, not orange as King and Gamble give it. The variety *membranifolia* based on the Tongka plant by King and Gamble is not worth retaining. It is typical *W. dubia* with a slight variation in the leaves often seen.

*W. religiosa* Benth. Perlis, Telok Jambu (14949), and other places round Kanga, a bush in rice fields, common. Kasum (Curtis), Lankawi, Kuala Kwah (Aniff).

The localities Singapore and Malacca given in the materials are doubtless from cultivated plants. It is commonly grown as a pot plant by Chinese.

Distrib. Siam, Tenasserim.

*Strophanthus Wallichii*, A. Dec. Perlis, Chupeng (14947), Tongka at Puket (Curtis 2931) Trang (Kunstler).

Distrib. India to Tenasserim.

*Rhynchodia Wallichii*, Benth. Lankawi, Kwah (Curtis, 3203).

Distrib. India, Burmah, Tonkin, Perak.

*Anodendron paniculatum*, Dec. Perlis, Kanga, (14953), Tongkah, Puket (Curtis, 2933). Flowers yellowish.

Distrib. India, Ceylon, Burmah, Malay islands to Philippines, Penang.

*Aganosma marginata*, Don. Lankawi, Kwah (Curtis, 2792), Trang, (Goldham, Kunstler, 1426).

Distrib. India, Burmah, and Malaya.

## ASCLEPIADEÆ.

*Gongylosperma lanuginosum*, n. sp.

Dwarf shrub with stout contort woody stem, warted with rough leaf-base scars. Leaves few, terminal, elliptic coriaceous, sub-sessile, 5-10 inches long,  $1\frac{1}{2}$ -3 inches wide, above sparingly pubescent, beneath woolly, apex and base blunt, petiole  $\frac{1}{2}$  inch long or less woolly, nerves 15-18 pairs sub-horizontal, slender. Cymes axillary, 2-3 inches long, woolly with few branches, terminating in small cymes. Flowers  $\frac{1}{8}$  inch long, dull red, pedicels  $\frac{1}{8}$  inch. Bracts very small, lanceolate. Calyx short, woolly with 5 very short ovate points. Corolla 5 ovate, blunt lobes tube hardly any. Coronal scales none. Stamens few with thick, filaments and short blunt anthers. Follicles 2, thick oblong blunt, 1 inch long,  $\frac{1}{4}$  inch wide, densely woolly, seed lanceolate, narrowed upwards, black,  $\frac{1}{8}$  inch long, rugose areolate, subterete, plume little longer of few white hairs.

Lankawi near Dayong Bonting on bare cliffs (CC. 2663).

Differs from *G. Curtisii* in the short thick stem large woolly leaves, pubescent calyx etc. The only flowers I have seen are indifferently preserved and the staminal column is very small and difficult to make out.

The genus is endemic.

*G. Curtisii*, King and Gamble. In the crevices of limestone rocks. Pungah (Curtis 2951). Endemic.

*Finlaysonia obovata*, Wall. Kasum (Curtis), common in tidal rivers from Singapore to Burma.

*Gymnanthera insularum*, King and Gamble. Lankawi small islands (Curtis). Endemic. The Genus is confined to the Malay islands and Australia.

*Atherandra acutifolia*, Decne. Lankawi at Kwah (Curtis), Setul (14959).

The lower leaves are rounded at the tip, not acute in the Setul plant.

Distrib. Penang and Java.

*Streptocaulon Wallichii*, Wight. Lankawi (Ridley and Curtis).  
Perlis, Chupeng.

Distrib. as far South as Perak.

*Secamone micrantha*, Decne. Terutau (Curtis, 2800), Perlis,  
Bukit Lagi (14958), Trang. (Kunstler).

Distrib. Penang, Java, Temor.

*Toxocarpus Curtisii*, King and Gamble. Lankawi (Curtis, 2616).  
Endemic.

*T. Lankawiensis*, King and Gamble. Lankawi, (Curtis),  
Endemic.

*Asclepias Curassavica*, L. Bangtaphan (Keith). A tropical  
weed from America, common now all over the tropics.

*Raphistemma pulchellum*, Wall. Lankawi, Kwah (Curtis).

Distrib. India and Burma.

*Cynanchum ovalifolium*, Wt. Lankawi, (Curtis), Setul (14957).

Distrib. Malaya.

*Gymnema acuminatum*, Wall. Lankawi, Kwah (Curtis)

Distrib. India to Java, Malacca.

*Marsdenia tinctoria*, Br. Bangtaphan (Keith).

Distrib. India, possibly wild in Malay peninsula, but  
certainly formerly planted by Chinese.

*M. volubilis*, Cooke. Pulau Badak (Curtis).

Distrib. India, Ceylon, Java.

*Tylophora tenuis*, Bl. Perlis, Kanga at Besih Hangat (14956).

Distrib. India, Burmah and Malaya.

*T. hirsuta*, var. Bangtaphan (Keith).

*T. asthmatica*, Wt. Bangtaphan beach (Keith). Flowers yellow, occurs also in Singapore, Pahang and Tringganu. Distrib. India, Siam and Malaya.

*Hoya diversifolia*, Bl. Kedah, along the river from Gunong Geriang, (14955), Road to Bukit Pinang (14954), Alor Sta, Lankawi.

Distrib. Burma, Java, Amboyna, whole peninsula.

There is a form of this with thin and one with thick peduncles.

*H. parviflora*, Wt. Setul. var? with lanceolate leaves acuminate at both ends, 3 inches long, 1 inch across. Perlis on the top of Bukit Lagi.

Distrib. Penang and Tenasserim.

*H. Ridleyi*, King and Gamble. Perlis, Kanga (14946) Lankawi (Curtis). Bangtaphan (Keith).

Distrib. whole peninsula very common.

*H. lasiantha*, Korth. Kopah (Fox). Distrib. Malay islands and peninsula, rare.

*Dischidia Collyris*, Wall. Bangtaphan (Keith). Lankawi (Aniff). Distrib. Burma, Malay peninsula.

*D. Rafflesiana*, Wall. Setul. Perlis, Chupeng.

Distrib. Tenasserim, Peninsula, Borneo, Australia.

*D. benghalensis*, Colebr. Lankawi, Pulau Hujung Duri (Curtis).

Distrib. India, Malaya.

*D. hirsuta*, Decne. Bangtaphan (Keith). Distrib. Burmah, Malay peninsula and islands.

*Dischidia, tomentella*, n. sp.

Long slender climber, branched, softly tomentose with curved white hairs. Leaves in pairs, fleshy, lanceolate, acute, base rounded, half an inch long,  $\frac{1}{6}$  inch wide, pustular when dry, sparingly sprinkled, with long white hairs, keel elevated, petiole very short. Peduncle  $\frac{1}{4}$  inch

long, flowers crowded at the top, pink and white. Pedicels slender  $\frac{1}{10}$  inch. Calyx lobes free, 5 ovate, obtuse, green, short, Corolla tube ovoid as long as the 5 acute erect lobes, A circle of stiffly erect white hairs in the mouth, otherwise glabrous. Corona of 5 elongate, lanceolate processes, outers short linear, Staminal column short, conic anther cells thick, fleshy, Pollen carriers minute, dark brown.

Perlis, Bukit Lagi (15225). The very small flowers make it difficult to analyze.

## LOGANIACEÆ.

*Fagraea Curtisii*, King and Gamble. Lankawi (Curtis, 1676) Pulau Segai (Aniff.)

*F. crenulata*, Maing. Kedah, Alor Sta. Distrib. Malay peninsula.

*F. fragrans*, Roxb. Perlis near Chupeng. Distrib. Malay peninsula and islands.

*Mitreola oldenlandioides*, Wall. Lankawi, Kwah (C. 3685).

Distrib. India, Burmah, Malay islands and Australia.

*Buddleia asiatica*, Lour. Bangtaphan (Keith.)

Distrib. Indo-Malaya, Indo-China, rare in the peninsula.

## GENTIANACEÆ.

*Exacum tetragonum*, Roxb. Perlis, fields at Kanga near Bukit Lagi, in long grass, Flowers bluish white.

Distrib. Burma, Borneo, Philippines absent from the Peninsula, Clarke's "Singapore Lobb" being an error.

*Microrhium pubescens*, Clarke. Lankawi Pulau Tanjong Sirih (Curtis), Kwah (Ridley and Curtis). Endemic.

*Canscora pentanthera*, Clarke. Lankawi, small islands (Curtis, 2516) also Limestone rocks Selangor and Perak.

*Limnanthemum indicum*, Thw. Perlis, ditches, Chupeng, Juttra. Lankawi. Distrib. Mascarene isles, Indo-Malaya, Australia.

*L. cristatum*, Griseb. Lankawi, Kwah (Curtis.) Distrib. India.

## HYDROPHYLLACEÆ.

*Hydrolea zeylanica*, Vahl. Perlis, Kanga, common in grassy fields.

Distrib. all tropics, but rare in the peninsula.

## BORAGINÆÆ.

*Tournefortia Wallichii*, Dec. Bangtaphan (Keith).

Distrib. Perak to Singapore, Java, Sumatra.

*T. argentea*, L. Pulau Nipis, Pulau Adang.

*Coldenia procumbens*, L. Kedah, Alor Sta; Perlis Kanga in waste ground, a deep green fleshy plant with minute yellow flowers.

Distrib. Cosmopolitan, but rare in the peninsula. Once found at Pekan, Pahang.

*Ehretia laevis*, Roxb. Bangtaphan (Keith,).

Distrib. Burmah, Malay peninsula and islands, Australia.

*Cordia Griffithii*, Clarke. Perlis, Bukit Iagi (15220).

*C. subcordata*, Lam. Tongkah (Curtis), Lankawi and Pulau Adang. Distrib. Indo-Malaya, Australia and Polynesia.

## CONVOLVULACEÆ.

*Erycibe citriniflora*, Griffith, Notul, IV. 284. (1854) Kedah, Alor Sta, also Penang Water fall (Curtis(2837).

Distrib. Moulmein, and Mergui.

This plant has been confused with *E. glomerata*, Bl. of Java and the Malay peninsula, from which it is very distinct in its hairy leaves and stems, yellow flowers, smelling of tree bugs according to Curtis of the unpleasant odour of black mustard according to Griffith.

The plant was named *E. glomerata*, Wall. Cat. 1338 (? of Blume) in the Flora of British India, then *E. Wallichii*, Prain and Hallier in Bull. Herb. Boiss, 5 (1897. p 382), but of course Griffith's excellent name is earlier than any of these and his description is quite clear enough except that he describes the leaves as "subglabris" whereas beneath the nerves are roughly hairy. It is omitted altogether from the Materials of the Malay peninsula.

*Erycibe expansa*, Wall. Lankawi at Kwah (Curtis, 2128) Kasum (Curtis. 2128).

Distrib. Tenasserim.

*E. glomerata*, Bl. Lankawi, Sungei Batu Asap (Aniff). Pungah, (Curtis, 2947). Shrub, flowers white.

Distrib. Perak, Java.

*Hewittia bicolor*, W. A. Bangtaphan (Keith).

Distrib. tropical Africa, S. E. Asia to Polynesia.

*Aniseia martinicensis*, Choisy. Bangtaphan (Keith). Distrib. Cosmopolitan.

*Jacquemontia paniculata*, Hallier. Perlis, base of Bukit Lagi, and at Ginting Kabok. (14900). Flowers pale blue.

Distrib. Eastern tropics.

*Merremia vitifolia*, Hallier. Bangtaphan (Keith). Perlis, Chupeng. Distrib. South East Asia.

*M. hastata*, Hallier. Setul. Bangtaphan and Bangtaphanoi (Keith). Distrib. Eastern tropics.

*M. coespitosa*, Hallier. Perlis, Kanga. Trang at Chong (Native). Distrib. Indo-Malaya and Indo-China.



- M. umbellata*, Hallier. Bangtaphan (Keith). A variety with hastate leaves. Distrib. tropics of old world.
- Ipomoea pes-caprae*, L. Bangtaphan. Bangtaphanoi (Keith), Perlis at Tebing Tinggi. Lankawi, Kwah on the seashore.  
Distrib. Cosmopolitan.
- I. littoralis*, Boiss. Flowers white, purple eye, Bangtaphanoi (Keith). Distrib. Cosmopolitan.
- I. sagittaeifolia*, Burm. Kedah, Alor Sta, common, (14899).  
Distrib. Indo-Malaya.
- I. staphylina*, Roem and Schult. Kedah, Alor Sta (Curtis).  
Distrib. Malay peninsula and Sumatra.
- I. polyantha*, Miq. Kedah, Alor Sta (Napier).  
Distrib. India and Java, absent from the peninsula.
- I. asarifolia*, Choisy. Bangtaphanoi. Erect in marshes 12 to 24 inches tall, flowers a fine red (Keith).
- I. campanulata*, L. Bangtaphan. Common on roadsides, white folds purple, tube yellow, deep purple at the base. (Keith). Distrib. India and Malaya.
- I. illustris*, Prain. Bangtaphan (Keith). Distrib. Bengal.

## SOLANACEÆ.

- Solanum nigrum*, L. Perlis, Chupeng (14983) Bangtaphan (Keith). Distrib. Cosmopolitan.
- S. involucratum*, Perlis, Kanga. Distrib. North of Malay peninsula, Java.
- S. indicum*, L. Bangtaphan (Keith). A shrub with purple flowers and orange colored fruits used in curries. Distrib. Indo-Malaya.
- S. torvum*, Sm. Setul, near Batu Bunga. Distrib. S. America, Indo-Malaya, China.
- S. verbascifolium*, L. Perlis, Kanga (14982) Bangtaphan Kanga; (Keith), tropics generally.

*S. aculeatissimum*, Jacq. Perlis near Telor Jambu rocks, Bangtaphan (Keith). Distrib. Malay peninsula.

*S. mammosum*, L. Bangtaphan (Keith). Established all over the peninsula.

*Capsicum frutescens*, L. Perlis, Limestone rocks. The Birdseye chili commonly runs wild on the limestone rocks.

*Physalis minima*, L. Bangtaphan, (Keith). Cosmopolitan.

SCROPHULARINEÆ.

*Adenosma capitatum*, Benth. Lankawi, Kesap (Curtis), Kasum (Curtis, 3253).

Distrib. South East Asia.

*A. hirsutum*, Kurz. Lankawi, Terutau (Curtis). Setul, common on the heath, (14926).

Distrib. Province Wellesley, Nicobars, Sumatra, Banka, and Borneo.

*Limnophila Roxburghii*, Don. Lankawi, Kwah, in running water (Curtis, 2556).

Distrib. India, Indo-China, and Philippines.

*L. micrantha*, Benth. Kedah, Alor Sta (14927) in ricefields; Setul heath (14929). Flowers all violet.

Distrib. Pahang East Coast. Indo-China.

*L. villosa*, Bl. Perlis, Kanga (14928), Lankawi, Burau, Setul, pastures. Distrib. Malay peninsula and islands.

*Limnophila viscida*, n. sp.

Whole plant 6 inches tall with spreading branches, 5 inches long, densely covered with small flowers. Leaves lanceolate, entire, narrowed to the base, obtuse, 2 inches long, half an inch wide, nerves about 6 pairs beneath glandular, scabrid. Flowers very numerous, the

branches, bracts and calyx thickly covered with glandular hairs. Bracts linear, lanceolate. Flowers almost sessile on a short pedicel with a linear, acuminate bract, sepals 5, linear, as long as the corolla tube,  $\frac{1}{8}$  inch. Corolla white tube straight, stout, lobes rounded, very small, all sparingly hairy, not glandular, Stamens 4, unequal in 2 pairs, filaments rather stout, hairy, anthers 2 celled, cells oblong, elliptic, yellow, separate. Style as long as the corolla, glabrous, stigma rounded with two setaceous processes behind it. Ovary glabrous. Capsule shorter than the sepals, oblong slightly narrowed upwards, grooved on each side, dehiscing longitudinally  $\frac{1}{2}$  inch long. Seeds numerous.

Perlis, Kanga, in fields. (15150). Near *L. micrantha*, Benth, but curiously glandular hairy.

*L. sessiliflora*, Bl. Lankawi paddy fields (Curtis, 2100). Flowers pink.

Distrib. India. Java and Japan, absent from the Malay peninsula.

*L. heterophylla*, Benth. var. *reflexa*. Lankawi paddy fields (Curtis). Flowers white. Bangtaphanoi (Keith). Flowers pale violet with darker stripes. Distrib. India, Borneo, Japan and China.

*Herpestes monniera*, H. B. K. Bangtaphanoi (Keith). Cosmopolitan.

*Torenia asiatica*, L. Bangtaphan (Keith). Distrib. India, Java, and China.

*T. ciliata*, Sm. A single plant almost entirely glabrous, Perlis, Chupeng, near the rocks in waste ground. Distrib. Malay peninsula.

*T. polygonoides*, Benth. Perlis, Chupeng. Distrib. Tenasserim. Malay peninsula, and islands.

*Vandellia crustacea*, Benth. Perlis, Kanga.

Distrib. tropics of old world,

*V. pedunculata*, Benth. Bangtaphan (Keith) Setul. Lankawi Terutau (Curtis). Distrib. Indo-Malaya, Cochin-China.

*V. scabra*, Benth. Bangtaphan (Keith). Flowers white.  
Distrib. tropics of old world.

*V. elata*, Benth. Kedah ricefields, Alor Sta (14934), Setul (14925).

*V. multiflora*, Don. Perlis near Bukit Hargat Besih (14926). Almost entirely glabrous. Apparently from description this Indian plant not previously recorded from the peninsula.

*Artanema angustifolium*, Benth. Perlis, Kanga, Tebing Tinggi, Bangtaphanoi (Keith). Some of the Tebing Tinggi plants had leaves like those of *A. sesamoides* Benth, but the flowers were exactly like those of the common plant.

*Bonnaya reptans*, Spreng. Kedah, Alor Sta (14930), Chong, (Native). Distrib. Indo-Malaya.

*B. veronicaefolia*, Spreng. Perlis, Kanga, Setul. Distrib. Indo-Malay.

*Scoparia dulcis*, L. Setul, common. Bangtaphan (Keith).  
Distrib. all tropics.

*Striga lutea*, Lour. Perlis, Kanga. Distrib. tropics of old world.

*Centranthera humifusa*, Wall. Setul. Distrib. Indo-Malaya.

#### LENTIBULARIACEÆ.

*Utricularia flexuosa*, Vahl. Common in ditches, Lankawi (Curtis). Perlis near Bukit Lagi, Chupeng etc. Distrib. Indo-Malaya to Australia.

*U. verticillata*, Benj. Lankawi (Curtis). Distrib. Malay peninsula.

*U. racemosa*, Wall. Setul heaths. Distrib. Malay peninsula.

*U. orbiculata*, Wall. Lankawi Telaya Tujoh (Curtis). Distrib. Indo-Malaya to China.

## GESNERACEÆ.

*Aeschynanthus marmorata*, Moore. Lankawi, Gunong Raya, (Curtis), Bangtaphan (Keith).

Distrib. Burmah, Mergui to Penang.

*Aes. Lobbiana*, Hook. Lankawi, Gunong Raya (Curtis, 2503).

Distrib. whole peninsula, Java, Sumatra, Borneo.

*Didymocarpus purpurea*, Ridl. Langkawi, Gunong Chin-Chang, (Curtis 2567). Endemic.

*D. inaequalis*, Ridl. Lankawi, Gunong Chin-Chang (Curtis). Endemic.

*D. lacunosa*, Hook. f. Terutau (Curtis). Endemic.

*Chirita viola*, Ridl. Lankawi islands, (Curtis).

Kedah, Gunong Geriang (14913). Setul, Batu Rajah Wang. Endemic.

*C. rupestris*, Ridl. Lankawi (Curtis). Endemic.

*C. mollissima*, Ridl. Pungah (Curtis). Endemic.

*Tetraphyllum roseum*, Stapf. Pungah (Curtis). Endemic.

*Paraboea ferruginea*, Ridl. Lankawi (Curtis). Endemic.

*P. regularis*, Ridl. Lankawi (Curtis), Endemic.

*P. laxa*, Ridl. Lankawi, Kwah (Curtis). Endemic.

*P. obovata*, Lankawi, Gunong Chin-Chang (Curtis). Endemic.

*Boea lanata*, Ridl. Lankawi, Dayong Bonting (Curtis), Endemic.

*B. acutifolia*, Ridl. Lankawi, Goa Chinta (Curtis). Endemic.

*B. divaricata*, Ridl. Lankawi, Ayer Hangat (Curtis). Endemic.

*B. suffruticosa*, Ridl. Lankawi, on a small island north of Kwah (Curtis). Endemic.

*B. patens*, Ridl. Pungah (Curtis). Endemic.

*B. glabra*, Ridl. Pungah (Curtis). Endemic.

*B. ferruginea*, Ridl, Lankawi (Curtis). Endemic.

*Phylloboea speciosa*, Ridl. Lankawi (Curtis). Endemic.

*Baeica brachyandra*, Ridl. Lankawi, Gunong, Chin-Chang at Kwala Malacca (Curtis). Endemic.

*Lepadanthus flexuosa*, Ridl. Kedah, Gunong Geriang on limestone rocks. Endemic (14912).

*Epithema saxatile*, Bl. Lankawi (Curtis). Distrib. All limestone rocks in the peninsula Java, Borneo, and Sumatra.

*Monophyllea glabra*, Ridl. Kasum (Curtis). Endemic.

#### BIGNONIACEÆ.

*Oroxylum indicum*, Vent. Perlis Kanga.

Distrib. India, Ceylon, Burmah, Cochin-China, Malay peninsula, Sumatra, Java.

*Dolichandrone Rheedii*, Seem. Perlis, Kanga, very common in the rice fields, one of the most abundant and conspicuous trees.

Distrib. Malabar-Coast, Ceylon, Burmah, Andamans whole peninsula to Singapore, and Islands to New Guinea. A tidal mud plant.

*Stereospermum fimbriatum*, Dec. Perlis, Chupeng, Torgka (Curtis).

Distrib. Burmah to Malacca.

*Radermachera amoena*, Seem. Perlis, Chupeng.

Distrib. Tavoy, Malay peninsula to Singapore, Java.

*Heterophragma adenophylla*, Seem. Kedah, Bukit Pinang near Alor Sta, Perlis, Chupeng.

Distrib. Burmah.

## ACANTHACEÆ.

*Thunbergia laurifolia*, Lindl. Lankawi, Kwah (Curtis).  
Perlis in hedges. Kanga. Bangtaphan (Keith).

It is curious to see this plant, usually a lofty jungle climber, growing low in hedges as at Kanga.

Distrib. Arracan to Malacca.

*Th. fragrans*, Roxb. Perlis, Tebing Tinggi, quite glabrous. Possibly an escape from cultivation. I have only seen it elsewhere as a garden escape.

var. *javanica*, Lankawi (Curtis), Perlis, Bukit Lagi, and Tebing Tinggi, Setul.

All these forms are only hairy beneath on the nerves, very different from the plant on the limestone rocks at Gua Batu, which is quite woolly on the back of the leaves. The true *fragrans* is an Indian plant.

*Nelsonia campestris*, R. Br. Open places common, Kedah, Alor Sta, Gunong Geriang, (14967), Perlis, Tebing Tinggi, (14968), Lankawi (Ridley, 8312). Bangtaphanoi, (Keith).

Flowers light blue, Keith describes it as pale blue at edge of upper lobes, middle purple, lower lobes violet, Bracts with white spots and hairs.

Distrib. Penang and Pahang. Both hemispheres.

*Staurogyne malaccensis*, Kze. Kedah, Gunong Geriang. Lankawi, Burau (Ridley). (Curtis). Perlis, Ginting Kabok (14966), Kasum (Curtis).

The Kedah and Perlis plants are more hairy than usual. The Burau plant a very small form on rocks in the stream.

Distrib. Tenasserim, as far north as Malacca, Java.

*S. lasiobotrys*, Kuntze. Lankawi at Kwah (Ridley, 8328) and at Sungei Batu Asap (Aniff).

Distrib. Moulmein, Mergui, Tavoy to Selangor.



*S. merquensis*, Kze. Lankawi, Gunong Chin-Chang (Curtis),  
Trang (Goldham).

Distrib. Mergui to Perak.

*Hygrophila angustifolia*, R. Br. Bangtaphanoi (Keith).

*H. quadrivalvis*, Nees. Kedah, Base of Gunong Geriang  
Perlis, Kanga and Tebing Tinggi. (This, a small leaved  
creeping form, 14975). Bangtaphan (Keith).

The commonest species. Distrib. India, Malay  
peninsula, Java, Borneo, Tonkin.

*Nomaphila stricta*, Nees. Swamps usually tidal, Perlis, Tebing  
Tinggi, very common (14984).

Distrib. Peninsula, Java, Philippines, Borneo.

*N. minor*, Clarke. Extremely abundant in dried up ricefields  
in Perlis, at Kanga (14983). Distrib. Perak.

*Ruellia repens*, L. Kedah, Alor Sta, and Gunong Geriang,  
(14963).

Distrib. Tenasserim to Singapore, China and Malay  
Archipelago.

*Aporuella axillaris*, Clarke. Perlis, Chupeng. Tongkah (Cur-  
tis). Endemic.

*Hemigraphis Ridleyi*, Clarke. Kedah, Gunong Geriang, Perlis,  
Chupeng, Bangtaphan (Keith).

Distrib. Pahang and Perak.

*H. platycarpus*, Clarke. Kedah, Alor Sta, dry places. Dis-  
trib. Malay peninsula.

*Hemigraphis alternata*, T. Anders.

Stem slender, glabrous except the young parts, strict  
little or not branched, leafy only at the top. Leaves lan-  
ceolate, acuminate at both ends, rather stiff subcoriaceous  
with the nerves very prominent beneath, in young leaves  
nerves covered with white hairs beneath, quite glabrous  
when adult, rather variable in shape, viz.

- (a) Narrowly lanceolate,  $2\frac{1}{2}$  inches long,  $\frac{1}{2}$  inch wide, nerves prominent ascending. (Perlis 15052).
- (b) Broadly lanceolate, 3 inches long,  $\frac{3}{4}$  inch wide, petiole longer  $\frac{1}{2}$  inch long, nerves more spreading. Setul (15051).
- (c) Much smaller plant often only 3 inches tall, leaves smaller, occasionally ovate, usually broadly lanceolate, 1 inch long,  $\frac{5}{8}$  inch wide. Inflorescence half to 1 inch tall, compact.

Bracts spatulate, ovate, acute, hairy with white hairs,  $\frac{1}{4}$  inch long. Calyx lobes lorate obtuse, thickly white hairy as long as the corolla tube. Corolla  $\frac{1}{4}$  inch long, white, lobes rounded, glabrous outside, mouth full of white hairs. Stamens 4, linear, oblong glabrous. Capsule  $\frac{1}{4}$  inch long, oblong, slightly flattened hairy at the tip, shortly beaked.

Kedah, Alor Sta in fields, Perlis, Kanga, Setul.

This plant seems to be very variable and different as these forms are in appearance they seem to run into each other, and I cannot specifically distinguish them.

*Cystacanthus punctatus*, n. sp.

Stem simple, leafy only at the top, 15 inches tall, about  $\frac{1}{8}$  inch through, internodes rather long and swollen at both ends. Leaves herbaceous, lanceolate, apex shortly acuminate, base long acuminate, glabrous when adult, margins undulate, 6 inches long, 2 inches wide, nerves 8 pairs meeting in straight arches. Inflorescence terminal spicate, 5 inches long, flowers numerous, crowded, rachis pubescent as are bracts and uppermost leaves. Bracts leafy ones, ovate, pubescent. Bracteols linear, pubescent,  $\frac{1}{8}$  inch long. Calyx lobes linear, acuminate, tube campanulate, as long as lobes, shorter than the bracteole, pubescent, Corolla half an inch long, tube campanulate, decurved, pubescent, lobes short, rounded,

white with pink spots in the throat. Stamens 2, filaments adnate to the corolla, base slender, glabrous, anthers oblong, style slender, glabrous, Capsule cylindric blunt, half an inch long.

Kopah (Fox, Ridley, 12607) with a drawing by Mohamed Aniff.

This is near *C. turgida*, but has apparently always a simple unbranched or little branched stem, larger leaves, and flowers quite different in coloring.

*Acanthopale malasica*, Clarke. Lankawi (Ridley.) Endemic.

*Acanthus ilicifolius*, L. Setul in tidal swamps by the river.

I have not met with this in the peninsula.

*A. ebracteatus*, Vahl. Setul, abundant in the fields round the rocks.

Though these plants dry badly and are somewhat difficult to distinguish when dry, no one could possibly confuse them in life. *A. ilicifolius* has flowers quite twice as large and of a bright azure blue, the great size of the blue lower lip makes it very showy. The fruits are also much larger. It is quite absent from the South of the peninsula. *A. ebracteatus*, has much smaller white (occasionally light blue) flowers, and smaller fruit. It is the common species all over the South of the peninsula.

*Gymnostachyum decurrens*, Stapf. Lankawi (Curtis).

Distrib. Pahang and Perak.

*G. diversifolium*, Clarke. Lankawi (Curtis), Setul.

Distrib. Perak.

*G. ceylanicum*, Arn. Lankawi (Curtis). Distrib. Ceylon.

*Gymnostachyum Keithii*, n. sp.

Erect or decumbent, woody, erect stem, 6 inches long. Leaves ovate, subacute, base rounded or slightly narrowed, glabrous above, pubescent on the midrib, beneath minutely pustular on both surfaces, nerves about

4 pairs,  $3\frac{3}{4}$  inch long,  $2\frac{1}{4}$  inch wide, petiole slender, 2 inches long. Spikes terminal 4, the longest  $9\frac{1}{2}$  inches, the others about 6 inches long. Flowers numerous, small, solitary, rachis pubescent, Bracts  $\frac{1}{10}$  inch long, ovate, acuminate. Calyx longer, lobes 5, lanceolate, acuminate, acute, Corolla short,  $\frac{1}{4}$  inch long, tube little longer than the calyx, bilobed, upper lobe white, lanceolate, lower lobe trilobed, lobes acute, more fleshy, white with purple centre. Stamens adnate to corolla mouth, anther oblong, rather large, black, "hidden in the folds of the lip." Ovary cylindric, style slender minutely pubescent, stigma clubbed. Capsule cylindric,  $\frac{2}{3}$  inch long, seeded minutely pustular.

Bangtaphan, Klang Loi (Keith). In shady places. Nearest I think to *G. polyneuron*, Clarke, which it resembles in habit, but with fewer nerves. It apparently creeps for some distance with stout roots, and then throws up an erect stem. I have only seen one specimen.

*G. polyneuron*, Clarke. Tongka (Curtis). Endemic.

*Andrographis paniculata*, Nees. Setul, a garden weed, flowers white, (14978).

Distrib. India to Penang.

*A. tenuiflora*, Anders. Lankawi, all collectors and Terutau (Curtis).

*Lepidagathis incurva*, Nees. Kedah, Gunong Geriang (14969); Lankawi, Perlis, Chupeng (14970).

Distrib. Penang, India, China, Malay islands.

*L. chlorostachya*, Nees. Bangtaphan, Klang Loi (Keith). A small specimen but apparently of the species. Pungah (Curtis). Distrib. Mergui.

*Barleria prionitis*, L. Perlis Rocks, Tebing Tinggi (14985), Bangtaphan. Distrib. Africa and India. Probably not wild here, said to be common in Siam.

*Eranthemum porphyranthos*, Clarke. A stouter form than usual, taller, flowers violet or white, leaves thicker. Seeds reticulate. Capsule pubescent. Kedah, Gunong Geriang. Perlis, Tebing Tinggi (14973); Bukit Lagi. Bangtaphan (Keith); Trang at Chong (Native).

Distrib. Malay peninsula.

*E. malaccense*, Clarke. Lankawi (8335, Ridley), Kwah (Curtis), Perlis, Chupeng (14971), Bangtaphan (Keith).

The flowers have smaller lobes than the typical plant and it is often dwarf here. It fruits here, which it rarely does elsewhere. Capsule 1-1½ inch long, narrowed base,  $\frac{3}{4}$  inch long, dilated portion  $\frac{1}{4}$  inch wide, beaked, glabrous, fuscous greenish. Seeds 4, orbicular, reticulate, rugose, brown.

*Clinacanthus Burmanni*, Nees. Tongkah (Curtis).

*Justicia subcymosa*, Clarke. Perlis, Tebing Tinggi, (14961), Kanga. Kedah, Gunong Geriang (14960).

Distrib. south to Selangor.

*J. selangorensis*, Clarke. Lankawi, Kwah (Curtis 2117).

Clarke quotes this number and has written up this sheet under *J. ptychostoma*, but it is exactly similar to the type of *J. selangorensis*, Ridley 7587, from Ginting Peras, except that the bracts are pubescent; the Selangor plant is however in fruit, and may have lost its pubescence.

*J. ptychostoma*, Nees. Lankawi (Curtis). Perlis, Ginting Kabok. Nainsap Bangtaphan (Keith). Distrib. Malay peninsula and Sumatra.

*J. uber*, C. B. Clarke. Chong (Native). Distrib. Limestone rocks, Perak and Selangor.

*J. valida*, n. sp.

A tall half-shrubby plant with a rather stout stem, glabrous, except the inflorescence and young parts which are pubescent. Leaves opposite, equal, herbaceous,

broadly lanceolate, 8 inches long by  $3\frac{1}{4}$  inches wide, apex acuminate, obtuse, base cuneate, nerves 8 pairs meeting in loops some distance from the margin, midrib prominent beneath, nerves elevate beneath, not above, bundles of raphides numerous and conspicuous when dry, petiole 1 to half an inch long. Inflorescence 8 to 10 inches long, thickly hairy. Flowers subsessile in whorls,  $\frac{1}{8}$  to  $\frac{1}{2}$  an inch apart. Bracts linear, acute,  $\frac{1}{8}$  inch long or less, Sepals lanceolate, acuminate, narrow, free nearly to the base, hairy. Corolla  $\frac{1}{4}$  inch long, hairy outside, tube short and stout, upper lobe green with pink spots, oblong obtuse, lower 3 lobed, lobes oblong, obtuse, hairy outside, green, Stamens 2 exsert, anthers elliptic, hairy on the back, cells parallel separate with a short mucro at the base, filaments long, linear. Disc cup shaped, hairy. Style hairy. Capsule glabrous, half an inch long, 2 seeded. Seeds flat, pale, rugose, reticulate.

Kedah. Woods at Gunong Geriang (15049), Bangtaphan, in damp shady places (Keith).

A stout branched shrublet about 2 feet tall, glabrous, except for the inflorescence, which curiously resembles that of *Eranthemum caudifolium*, Clarke.

*J. rupestris*, n. sp.

Stem slightly woody, slender, terete, branched, glabrous below, younger parts with a line of curly white hairs on each side, branches opposite, whole plant about 12-18 inches tall. Leaves opposite, equal, lanceolate, acuminate, at both ends, 5 inches long, 1 inch wide or less, subcoriaceous, adults glabrous except the midrib on both surfaces, covered with appressed yellowish hairs, petiole  $\frac{1}{4}$  inch long, winged to base, margined with curly hairs. Flower spikes terminal on the ends of the branches subcylindric, obtuse, 1 inch long. Bracts orbicular, petioled, nearly  $\frac{1}{4}$  inch long, green, apex rounded, bright green, pubescent, margins with slightly longer hairs. Calyx shortly tubular,

teeth narrow, acuminate, linear, pubescent,  $\frac{1}{10}$  inch long. Corolla white,  $\frac{3}{8}$  inch long, hairy outside, tube shorter than the limb cylindric, upper lobe elliptic, ovate, apex rounded, lower longer, 3 lobed, lateral lobes acute, narrow, short, median broader, rounded, palate with radiating raised nerves. Stamens 2, shorter than the corolla, glabrous, filaments cylindric, anther cells half elliptic, separate, 2, one slightly above the other, tail very short, ovoid, not conspicuously white. Style filiform, pubescent, ovary pubescent. Capsule  $\frac{3}{8}$  inch long, pubescent outside, rather broad. Seeds ovoid, flat, reticulate.

Perlis, Bukit Lagi, (Feb. 27) 15051, allied to *J. ptychostoma*, Nees. but more shrubby with hairy flowers.

*Dicliptera rosea*, n. sp.

Herb, stem 4-angled, glabrous, about a foot tall, branched. Leaves opposite, equal, lanceolate or ovate, base subcuneate, apex shortly, bluntly acuminate, glabrous except on midrib above and nerves beneath with brownish adpressed hairs, nerves. 6 pairs,  $1\frac{1}{2}$  to 3 inches long,  $1-1\frac{3}{4}$  inch wide, petiole  $\frac{1}{4}$  inch long. Flowers crowded in cymes in the upper axils and forming a terminal spike. Bracts ovate, cuspidate, nearly sessile,  $\frac{1}{4}$  inch long, green, hairy, margins fringed with longer hairs. Flowers sessile, sepals linear, free, nearly to base  $\frac{1}{8}$  inch long, pubescent. Corolla pink, tube  $\frac{1}{4}$  inch long, cylindric, lobes as long linear, oblong, obtuse, slightly hairy at the base. Stamens 2, filaments long, yellow, glabrous, anthers curved, 2 celled, elongate. Style filiform, ovary, oblong, hairy. Disc cupular. Fruit  $\frac{1}{8}$  inch long, narrow, hairy on the back, seed elliptic, flat, cinnamon brown, margins pustulate.

Kedah, Gunong Geriang; on dry slopes of limestone rock (15050) a. Perlis, Bukit Lagi (5050). Abundant.

Very like *D. Macleari* of Christmas Island, from which it differs in its obovate more rounded bracts, pubescent and very shortly mucronate, the lower ones in the spike being rounded and not armed.



*Rhinacanthus communis*, Nees. Perlis, Tebing Tinggi, Tongka at Puket (Curtis), Setul (14977), Bangtaphanoi (Keith). Distrib. all over the East except the Malay peninsula, but said to be cultivated only.

*Peristrophe acuminata*, Nees. Kedah, Alor Sta. Distrib. Tavoy to Java, very common in the Malay peninsula.

*P. bicalyculata*, Nees. Setul, apparently this species. Distrib. Africa and India.

*Rungia minutiflora*, Clarke. Lankawi, small Islands, (Curtis, 3689). Endemic.

*R. pectinata*, Nees. *R. parviflora*, var. Perlis, Kanga (14962). Open fields. Distrib. India.

#### VERBENACEÆ.

*Stachytarpheta jamaicensis*, Vahl. Very common at Setul.

*Geunsia farinosa*, Bl. Lankawi, (Curtis, 2552), Bangtaphan (Keith). Distrib. Malaya.

*Callicarpa angustifolia*, King and Gamble. Lankawi (Ridley, 8330). Distrib. Limestone rocks, Perak.

*C. cana*, L. Perlis, Tebing Tinggi (14945).

Distrib. Malay peninsula and islands, Australia.

*C. longifolia*, Lam. Lankawi (Curtis, 2134), Bangtaphan (Keith). Distrib. Nicobars to Malaya and Australia.

*Premna integrifolia*, L. var. *angustior*, Lankawi (Curtis). Distrib. Tenasserim to Singapore.

*P. foetida*, Reinw. Variety with smaller ovate cordate leaves with sinuate edges. Kedah, Alor Sta (14944), Perlis, Kanga.

Distrib. Malaya.

*P. trichostoma*, Miq. Terutau (Curtis 2796).

Distrib. Malaya.

*P. cordifolia*, Roxb. Perlis, Chupeng (14943).

Distrib. Malay peninsula.

*Gmelina villosa*, Roxb. Lankawi (Curtis), Perlis woods by Bukit Besih Hangat, Kanga (14942). Distrib. Burmah, Nicobars, Siam and Malaya.

*Clerodendron neriifolium*, Wall. Lankawi (Curtis), Perlis near Tebing Tinggi, Bangtaphan (Keith.)

Common in tidal swamps. Distrib. Burmah, Malaya to Polynesia.

*C. Lankawiense*, King and Gamble. Terutau (Curtis, 3789) Lankawi, Telaya Tujch (2515). Endemic.

*C. penduliflorum*, Wall.

Kedah, Gunong Geriang (Ridley 14940 Napier). Tongka (Micholitz), Trang at Chong.

Distrib. Burmah, Nicobars, Penang, and Limestone rocks, Perak and Selangor.

*C. infortunatum*, L. Pungah (Curtis, 3251).

*C. villosum*, Bl. Bangtaphan (Keith). Perlis, Chupeng, common. Distrib. Burmah and Malaya.

*C. paniculatum*, L. Bangtaphan (Keith). Distrib. Siam and Malaya.

*Cl. siphonanthus*, Br. Kedah near Bukit Pinang, Alor Sta, Kopah (Aniff), Bangtaphanoi (Keith).

Distrib. India, Siam, Malay islands, Pahang East Coast, Singapore, Perak.

*Vitex trifolia*,

The creeping sea shore form with one foliolate leaves. Bangtaphanoi (Keith).

var. typical; erect shrub, trifoliate.

Bangtaphan (Keith), Lankawi, Burau Bay.

Distrib. Indo-Malaya, Australia, Japan.

*V. siamica*, Williams. Lankawi, Dayong Bonting and Kwah. Fox (Ridley, 12720), (Curtis, 1683).

Distrib. Limestone rocks and Selangor.

*V. pubescens*, Vahl. Perlis, Kanga (14939), Setul (14938). Distrib. India, Burmah, Malaya.

*Peronema canescens*, Jack. Perlis, Chupeng.

Distrib. Malaya.

*Glossocarya premnoides*, n. sp.

Shrub, stems closely brown, pubescent, internodes half an inch long, Leaves opposite, ovate, apex rounded, base cordate, thinly coriaceous, 2 inches long,  $1\frac{1}{2}$  inch wide, above glabrous or in younger ones pubescent on the nerves beneath, nerves usually pubescent, nerves 4 pairs, curved ascending, petiole  $\frac{1}{4}$  inch long, pubescent. Panicle short, dense, sessile, pubescent, 2 inches long,  $2\frac{1}{2}$  inches wide, flowers numerous, small. Bracts minute. Calyx urnshaped, very obscurely 5 lobed, pubescent,  $\frac{1}{8}$  inch long. Corolla white, tube slender,  $\frac{1}{4}$  inch long, pubescent, lobes 4 pubescent outside. Stamens 4, long exsert filiform, longer than the corolla, anthers minute, elliptic. Style long filiform, with 2 short filiform stigmas, Fruit cylindric, rounded at the tip, pubescent,  $\frac{1}{4}$  inch long, dehiscing into four valves each containing a single linear oblong seed rounded on the back, angled in the inner face.

Perlis, Besih Hangat (15149).

Three species of *Glossocarya* are recorded, one from Ceylon, one from Burma, and one from Australia. The Perlis plant has a much more compact inflorescence than the Ceylon species, and the leaves are not cordate.

*Sphenodesme ferruginea*, Briquet. *S. microstylis*, Clarke.

Lankawi, Terutau (Curtis). Kedah, Bukit Pinang near Alor Sta (14938). Perlis, Kanga, very common, Setul, Punga (Curtis).

Distrib. Burmah, Moulmein and Mergui, Tavoy, Siam.

The specific name *ferruginea* is extremely unsuitable for a plant of which flowers and fruit are of a pale whitish yellow. This plant is very conspicuous all over this district, growing in open places and forming samentose bushes. The flowers are small and whitish yellow. The bracts are nearly white, a very showy plant with its great masses of bracts.

*S. triflora*, Wight. Lankawi (Fox).

Distrib. Whole peninsula and Sumatra.

*S. pentandra*, Jack. Lankawi, Kwah (Curtis, 2522), Setul, Bukit Rajah Wang (14947), Bangtaphanoi (Keith).

Distrib. Indo-Malaya.

*Congea tomentosa*, Roxb. Kopah (Aniff), Punga (Curtis, 2969), Bangtaphan abounding in big trees in jungle (Keith).

Distrib. Burmah, Chittagong, Siam.

*Avicennia officinalis*, L. Kedah, very common at the mouth of the rivers, Alor Sta. also Perlis and Setul.

#### LABIATÆ.

*Orthosiphon stamineus*, Benth. Lankawi, Kwah (Curtis), Bangtaphan (Keith). I saw it in an old garden at Setul but possibly introduced. It is certainly not wild in Singapore and probably not in Kunstler's locality in Perak. It is common in cultivation as a drug and ornamental plant, and known as Kumis Kuching.

*Cymaria dichotoma*, Benth. Kedah on Gunong Geriang (14927), Perlis, Bukit Lagi, (14929), Bangtaphan (Keith).

Distrib. Limestone rocks as far south as Ipoh and Burmah. Flowers yellow.

*Dysophylla verticillata*, Benth. Lankawi (Curtis). Perlis, Bukit Hangat Besih, Kanga, in ricefields. Distrib. S. E. Asia and Australia. Absent from the peninsula.

*D. auricularia*, Bl. Perlis, Kanga. Distrib. S. E. Asia.

*Leucas zeylanica*, Rox. Setul. Distrib. S. E. Asia.

*L. lavandulifolia*, Sm. Perlis at Kanga. Distrib. S. E. Asia, Mascarenes.

*Moschosma polystachyum*, Benth. Kedah, rice-fields near Gunong Geriang (14930), Perlis, Tebing Tinggi (14928), Bangtaphanoi (Keith). Flowers blue and white. Distrib. Indo-Malaya, Africa, and Australia, absent from the Malay peninsula.

*Anisochilus siamensis*, n. sp.

Branched herb, 12 inches tall, stem hairy with thin white hairs, not angled. Leaves lanceolate, sessile, subacute,  $1\frac{1}{2}$  inch long,  $\frac{1}{4}$  inch wide, hairy. Flowers in dense cylindric, terminal spikes, sessile, very small. Bracts oblong rounded at the tip, excavate nerved, hairy at base. Calyx bilobed, upper lobe very short, entire, lower lobe oblong with a rounded tip, thickly hairy at the base, dark brown colored above, Corolla tube campanulate short, upper limb spathulate, oblong lipped with white hairs, lower 3 lobed spreading, side lobes short, obtuse, median as long thickened at the tip, tube white, limb blue, whole flower  $\frac{1}{8}$  inch long. Stamens 4, filaments exsert, hairy, blue, anthers small globose. Style filiform with 2 short filiform arms.

Bangtaphan paddy fields (Keith), abundant, Bracts Purple and green.

I cannot fit this species into any of those described in the flora of British India. I have not seen the fruiting calyx by which Hooker sorts the species, but the calyx in flower has the upper tip entire, very short, and except at the base glabrous.

(*Acrocephalus capitatus*, Benth. I find in looking over the herbarium, I collected a single plant of this Indian species at Pulau Tawar in Pahang in 1891. The flowers were light blue. It has not previously been recorded from the peninsula).

APETALÆ.

NYCTAGINÆ.

*Boerhaavia repens*, L. Lankawi, Kwah Beach (14932),  
Bangtaphanoi (Keith). Distrib. Tropics generally.

*B. repanda*, Wild. Perlis in the mouth of the cave and  
along the face of the rocks, Chupeng (15153).

A very pretty bright rose pink flower with long  
stamens and stout woody rhizomes. Distrib. India to  
Burmah.

*Pisonia aculeata*, L. Scandent on limestone rocks, Perlis,  
Bukit Lagi (15216). Distrib. Tropics generally, not  
known from the peninsula.

AMARANTHACÆ.

*Deeringia celosioides*, Br. Perlis, Chupeng (14943), Bang-  
taphan (Keith).

The short spiked form with white fruit according  
to Keith. It is usually scarlet. Distrib. India, Malaya,  
China, Australia.

*Cyathula prostrata*, Bl. Bangtaphan (Keith).

Distrib. Tropics generally.

*Alternanthera sessilis*, Br. Bangtaphan and Bangtaphanoi  
(Keith). Distrib. Tropics.

*Amaranthus viridis*, L. Lankawi, Kwah beach (14931).

Distrib. whole Tropics.

*A. spinosus*, L. Bangtaphan (Keith). Distrib. all Tropics.

*A. gangeticus*, L. Bangtaphan (Keith). Red leaved variety.  
All Tropics.

*Achyranthes aspera*, L. Bangtaphan (Keith).

Distrib. whole world.

*Gomphrena globosa*, L. Bangtaphan (Keith).

*Psilotrichum trichotomum*, Bl. Setul.

Distrib. Assam, Pegu, Borneo, Philippines.

#### POLYGONACEÆ.

*Polygonum minus*, Huds. Bangtaphan (Keith). Setul rice-fields near Batu Bunga.

Distrib. Palaearctics to Malay peninsula.

*P. barbatum*, L. Kedah near Gunong Geriang, Perlis, Chupeng and Tebing Tinggi (14929), Bangtaphanoi (Keith). Distrib. Tropics.

*P. tomentosum*, Willd. Perlis, Telok Jambu, Kanga (14928).

Distrib. Africa to Indo-Malaya.

*P. stagninum*, Meissn. Perlis, Tebing Tinggi (14927). Bracts red, flowers white. Distrib. India to Burmah.

#### PODOSTEMONACEÆ.

*Podostemon algaeformis*, Benth? Bangtaphan, Klong Thong (Keith).

This is the first species of this order yet met with here. I have sought in vain for any species in the Malay peninsula.

#### ARISTOLOCHIACEÆ.

*Bragantia tomentosa*, Bl. Kedah, Bukit Pinang near Alor Sta. Lankawi, Tanjong Sirih and Lankawi island (Curtis). Perlis, Ginting Kabok.

Distrib. Sylhet, Moulmein, Malay peninsula and Java.

#### NEPENTHACEÆ.

*Nepenthes phyllamphora*, Jack. Lankawi (Md. Aniff). Distrib. Indo-Malaya.



The rarity of pitcher plants in this region is very marked.

PIPERACEÆ.

*Piper ribesioides*, Wall. Lankawi (Curtis).

Distrib. Burmah to Singapore.

*P. retrofractum*, Tongka (Curtis), Bangtaphanoi (Keith).  
"A climber round a tree near a house, the fruit eaten  
and used as a medicine for ulcers."

*P. miniatum*, Bl. Lankawi (Curtis).

Distrib. Malay Peninsula and islands.

*P.* *sp.*

Perlis, Tebing Tinggi (14966). A climbing pepper,  
covering the rocks in dense masses with deep green  
shining leaves. Only very young spikes of flowers seen.

CHLORANTHACEÆ.

*Chloranthus officinalis*, Lankawi, Kwah (Ridley). Distrib.  
Malay peninsula.

MYRISTICACEÆ.

*Myristica Irya*, var. *longifolia*, Setul, Bukit Rajah Wang  
(14957). Distrib. Ceylon, Burmah, Malay.

*M. majuscula*, King. Kopah (Aniff). Distrib. Malay penin-  
sula.

*M. missionis*, Wall. Perlis, Chupeng (14958). Lankawi, Kwala  
Kwah (Aniff).

A variety with more coriaceous leaves, at Setul  
(14959)

Distrib. Burmah, Malay peninsula.

## LAURINEÆ.

These were named for me by Mr. Gamble.

*Phoebe paniculata*, Nees. Chong in Trang (14737).

Distrib. Nepal to Burmah and the Malay peninsula.

*P. cuneata*, Bl. var. Chong (Native collector).

*Nothophoebe umbelliflora*, Bl. Puket (Curtis, 2933).

*Litsea polyantha*, Juss. Bangtaphan (Keith). Distrib. India, Tenasserim, and Malay peninsula.

*L. amara*, Bl. A form with small leaves. Kedah, Alor Sta, Perlis, Kanga (15186) var. *attenuata*, Meissn. Kedah, Gunong Geriang (14965), Lankawi (Curtis, 2610).

Distrib. common in the Malay peninsula. Pegu and Tavoy.

*L. chinensis*, Lam. Bangtaphan (Keith).

*L. lankawiensis*, Gamble. Terutau (Curtis, 2793). Endemic.

*L. grandis*, Wall or very near. Kopah (Aniff).

*Tetradenia zeylanica*, Nees. Setul (14962, 14964). Lankawi, Kwah (Aniff). Common on open sandy places, Indo-Malaya.

*Cassytha filiformis*, L. Perlis at Chupeng (14918), Setul (14919), Bangtaphan beach (Keith).

Distrib. Tropics generally, usually by the sea.

*Hernandia peltata*, Meissn. Trang (Goldham), Pulau Adang.

Distrib. Eastern Tropics.

## PROTEACEÆ.

*Helicia excelsa*, Bl. Setul. Lankawi, Sungei Batu Asap (Aniff).

Distrib. Tenasserim, Cambodia, and the Malay peninsula.

THYMELEACEÆ.

*Linostoma pauciflorum*, Griff. Perlis at Chupeng. A form with the bracts, tinted, light rose pink instead of the ordinary yellowish white, (14916).

Distrib. Tenasserim to Singapore and Sumatra.

*Scleropyrum Wallichianum*, Arn. Lankawi at Sungei Batu Asap (Aniff).

Distrib. Deccan Peninsula and Ceylon. This is very distinct from *Scl. maingayi*, Hook. fl. which is common in the peninsula and which has simple solitary stamens, not bifid or in connate pairs as in *Wallichianum*. *S. maingayi* described dubiously as spiny in the Flora of British India has the stem furnished with many strong spines.

LORANTHACEÆ.

*Viscum articulatum*, Burm. Setul on the heath (14925).

Distrib. India, South to Ceylon and Singapore and Malay islands.

*V. monoicum*, Roxb. Kasum (Curtis, 3265).

Distrib. India to Tenasserim.

*Loranthus pulcher*, Dec. Setul (14923).

Distrib. Malay peninsula.

*L. coccineus*, Jack, Perlis, Chupeng (14922).

Distrib. Ava, Malay peninsula to Singapore.

*L. ferrugineus*, Roxb. Lankawi (Curtis, 2640).

Distrib. Penang to Singapore, Java, Sumatra.

*L. malaccensis*, Hook. fl. Kedah, Alor Sta (14924).

Distrib. Peninsula.

*L. pentandrus*, L. Setul. A stout form (14921).

Distrib. Sylhet to Singapore, Malay islands.

*L. crassus*, Hook. fil. Lankawi (Curtis, 2641).

Distrib. Peninsula to Singapore.

*L. grandifrons*, King. Kasum (Curtis, 3266).

Distrib Malay Peninsula.

*L. ampullaceus*, Roxb. Perlis, Kanga (14920), Lankawi (Curtis), Setul (14920).

Distrib. Bengal to Singapore.

*L. aenis*, Bl. Setul. Flowers red, (15238). This differs from Blume's figure in the Flora Javae only in the nerves of the leaf being visible and the petiole slightly longer. Blume's figure is however taken from the life and the nerves may be invisible then. Native of Java and Sumatra.

#### SANTALACEÆ.

*Henslowia varians*, Bl. Perlis, Chupeng (14926), Lankawi (Curtis).

Distrib. Tenasserim to Singapore and Borneo.

*H. buxifolia*, Bl. Perlis, Chupeng (14933).

Distrib. Malacca, Singapore, Borneo.

*Champereia Griffithiana*, Planch. Lankawi (Aniff). Distrib. Burmah, Malaya.

#### BALANOPHORACEÆ.

*Balanophora dioica*, Br. Bangtaphan (Keith). Specimen poor and somewhat doubtful.

#### EUPHORBIACEÆ.

*Euphorbia antiquorum*, Lam.

On limestone rocks in Lankawi at Kwah (Curtis, 2580) and Pulau Hujung Duri, Perlis, Bukit Lagi, Tebing Tinggi.

Undoubtedly wild here, it occurs at the dry exposed tops of the limestone ridges. Curtis says that the hard woody part of the stem is in repute as medicine under the name of Tras Sudu.

*E. pilulifera*, L. On the beach, Bangtaphan (Keith). Distrib. all warm countries.

*E. atoto*, Forst. Bangtaphan (Keith).

Perlis on the mud banks between the riciefields at Kanga. A most unusual locality for this seasand-hill plant (14896).

Distrib. Indo-Malaya, China, Australia.

*Buxus rupicola*, n. sp.

Shrub with pale corky bark. Leaves alternate, elliptic oblanceolate, obtuse, base acuminate, stiffly coriaceous, nerves invisible, margins recurved,  $2\frac{1}{4}$ -3 inches long,  $\frac{3}{4}$ -1 inch wide, petiole  $\frac{1}{4}$  inch, winged to the base. Flowers in short axillary racemes or panicles,  $\frac{1}{4}$  inch long. Bracts persistent, ovate,  $\frac{1}{3}$  the length of the pedicels. Male flowers on short scurfy pedicels,  $\frac{1}{10}$  inch long. Sepals 4, triangular, ovate, blunt. Stamens 4, filaments slender, a little longer than the sepals, anthers curved, obtuse. Female flowers terminal on the racemes,  $\frac{1}{8}$  inch long. Sepals as in males, but 2 more outer ones and apex more rounded. Styles 3, short, thick, recurved, separate to base. Fruit not seen.

Lankawi near Dayong Bonting, Feb. 1890. (Curtis, 2662). A shrub growing on almost bare rocks close to the sea.

The distribution of the genus *Buxus* is rather remarkable in that, though widely scattered over the world in both cold and hot climates, there are considerable areas in which it is not met with. There are between twenty and thirty species known occurring in Europe. Temperate Asia and America both Mainland and the

West Indies, Africa and its islands but is absent from the Malay region except the Philippines where there is one species.

*Bridelia tomentosa*, Bl. Lankawi (Curtis).

Distrib. Indo-Malaya, China, Australia.

*Br. pedicellata*, n. sp.

A small tree, Leaves alternate, elliptic or oblong obtuse, rounded at both ends, when young thin, densely covered with grey pubescence, adult coriaceous, glabrous, glaucous beneath, nerves 6 or 7 pairs, reticulations conspicuous under the lens, 2-4 inches long, 1 to 2 inches wide, petiole short,  $\frac{1}{2}$  inch long, thickened, black, wrinkled. Flowers crowded in capitula, with numerous ovate, acuminate bracts, ciliate on the edges. Male flower  $1\frac{1}{10}$  inch long, shortly pedicelled with a thick pedicel, sepals 5, triangular, acute rather thick. Petals thin, shorter, ovate. Disc thick, annular margins undulate. Stamens short, filament rather thick, anther subglobose, shorter than the petals, Female flower perianth similar. Fruit red, obovoid, glabrous, narrowed at the base, supported on the pedicel with the persistent perianth.

Lankawi, Kwah, (Curtis, 3688; Ridley, 8326). Perlis, Bukit Lagi (14889). Also Penang Coast (Curtis, 1736).

This species differs from *Br. penangiana*, Hook. f. in its obtuse leaves, rounded at the tip, its nearly glabrous capitula, and the pedicel of the flower and fruit, and the lanceolate acute sepals.

*Br. Curtisii*, Hook. fil. Lankawi (Curtis).

Distrib. Penang.

*Cleistanthus trichocarpa*, n. sp.

A small tree or bush, very glaucescent, young parts hairy, Leaves elliptic, acute or acuminate, coriaceous, base rounded, above glabrous, smooth and shining light green, nerves beneath 6 pairs, elevated as are the reticulations, all

hairy, midrib above, hairy,  $1\frac{1}{4}$ - $1\frac{3}{4}$  inch long,  $\frac{3}{4}$  inch wide, petiole  $\frac{1}{10}$  inch long, hairy. Bracts setaceous, silky hairy, Male flowers  $\frac{1}{4}$  inch across, shortly stalked, Sepals long, narrowly lanceate, triangular, silky hairy outside. Petals about  $\frac{1}{4}$  as long obovate, spathulate, apex broad, rounded, fleshy, minutely pubescent. Disc annular sinuate, fleshy, glabrous. Staminal column twice as long as the petals, filaments free for  $\frac{1}{3}$  of their length, Anthers 5, dorsifixed versatile, elliptic, the cells divaricate at the base, all glabrous. Female flowers larger, obovoid, sepals narrower, long, acuminate, silky hairy. Petals much shorter than the sepals oblong subspathulate silky hairy. Ovary silky hairy, style base short, arms 3, bifid slender, glabrous shorter than the sepals. Capsule  $\frac{1}{4}$  inch long and as wide, deeply three lobed, covered with light brown appressed hairs.

Lankawi, Kwah (Ridley, 8306); (Curtis, 2795); Kedah, Alor Sta (14884), Perlis, Chupeng (14885), Setul (14886), also Penang Hill (Ridley, 10209).

This plant is extremely abundant over Lankawi and the mainland opposite. It is allied to *C. hirsutulus* and to *C. membranaceus*, Hook. fil. but its small leaves, larger flowers, and different petals, acuminate sepals make it very distinct.

*Cleistanthus ? dubius*, n. sp.

Large shrub, or small tree. Bark of branches dark brown, branches zigzag or hardly so. Leaves alternate, rather distant, thinly coriaceous, entire, elliptic to elliptic lanceolate, acuminate at the tip, narrowed at the base, nerves conspicuous, 5-8 pairs meeting in arches, well within the margin, glabrous, dark brown above, red brown beneath, 5-6 inches long, 2 inches wide, petiole rather thick,  $\frac{1}{8}$  inch long. Flowers in small axillary tufts of numerous broadly ovate, acute, glabrous bracts. Males on short  $\frac{1}{8}$  inch pedicels, about  $\frac{1}{8}$  inch long, glabrous. Sepals oblong truncate. Petals much smaller, linear, setaceous. Stamens



in a column, five anthers linear, curved, connate on the top of a shorter peduncle, above them a conic appendage. No disc. Females larger on longer pedicels, sepals and petals as in males, but larger sepals strongly keeled on the back margins, thin. Ovary glabrous, ovoid, adnate at base to sepals, styles 3, very short, each with 2 vertical, linear, oblong stigmas. Fruit globular bladdery,  $\frac{1}{2}$  inch long on a short stalk.

Lankawi, Gunong Raya (Curtis, 2648), Kwah, (Ridley, 8331). Also Kedah, Gunong Terai (Ridley, 5362), and Taiping Hills.

I put this into *Cleistanthus* with doubt. It has the flowers of *Cleistanthus*, but the fruit is quite unlike that of any species of the genus. It might be put into a distinct genus.

*Cleistanthus* ? *minutiflorus*, n. sp.

Climbing shrub, hanging on boles of trees (Keith), tree (Ridley). Leaves alternate, coriaceous, ovate, subacute glabrous, narrowed slightly at the base, nerves 7 pairs, nervules in conspicuous drying grey above, brown beneath,  $3\frac{1}{2}$  inches long,  $1\frac{3}{4}$  inch wide, petiole thick,  $\frac{1}{8}$  inch long. Bracts ovate, subulate, hard. Flowers in small capitula sessile axillary. Males not seen. Female flowers minute,  $\frac{1}{16}$  inch long, shortly pedicelled, pedicel and sepals hairy, sepals 3, lanceolate, caudate. Petals 3, short, acute, lanceolate. Pistil shortly stalked, 3 carpelled, carpels separate? Styles short, straight, entire.

Bangtaphan (Keith, May 16th, 1890); Pahang, Kota Glanggi (Ridley, 2356).

Flowers green. I am doubtful as to the genus of this curious plant.

*Cleistanthus gracilis*, Hook. fil. Lankawi (Curtis, 2810). Pelis, Tebing Tinggi (14908).

Also occurs in Perak, and on the limestone rocks of Kota Glanggi, Pahang. A pretty little bush or treelet, only occurring on limestone rocks.

*Phyllanthus urinaria*, L. Bangtaphan (Keith).

Distrib. whole tropics.

*Ph. niruri*, L. Lankawi, Kwah (Curtis).

Distrib. whole tropics.

*Ph. madraspatensis*, L. Lankawi (Curtis). Bangtaphan (Keith).

Distrib. Tropics, Africa and Asia.

*Ph. simplex*, Retz. Perlis in fields about Kanga, in long grass, (14897).

Distrib. India. Malaya, China, Australia.

*Ph. columnaris*, Muell. Arg. Lankawi, Pulau Tanjong Sirih (Curtis, 2501).

Distrib. Pegu to Tenasserim.

*Ph. bocobotryoides*, Wall? Lankawi (Ridley).

A very curious and distinct plant. In young fruit, the fruit is in slender spikes, several in an axillary tuft,  $1\frac{1}{2}$  inch long, or solitary 5 inches long. Bracts lanceolate obtuse; fruits distant globose with a short discoid stigma as in *Breynia*, but there are 5 ovate sepals.

*Ph. (Reidia) secundiflora*, n. sp.

Shrub with slender branches, white, tomentosely hairy. Leaves herbaceous than elliptic acute, base rounded broad, very unequal-sided, sparingly hairy on both sides, glaucous beneath, (deciduous when dry) 2 inches long, 1 inch wide at the base, petiole  $\frac{1}{10}$  inch long, pubescent. Flowers in small tufts of hairy bracts. Males not seen. Females secund. Pedicels in fruit,  $\frac{1}{4}$  inch long, pubescent, solitary with two lanceolate, acuminate bracts, sepals triangular, oblong lacerate. Fruit globose, dark brown with scurfy papillae at the tip, larger than in the next species.

Perlis, Telor Jambu Hill, Kanga (15189).

This is peculiar from having the female flowers all twisted round so as to be secund. The leaves too are deciduous.

*Ph.* (§ *Reidia*) *Perlensis*, n. sp.

A shrub with the branchlets crowded at the top of the branches; branchlets slender, glandular, pubescent with curly white hairs. Leaves distichous, elliptic, acute, narrowed at the base, acute, unequal sided, herbaceous,  $1\frac{1}{4}$  inch long,  $\frac{1}{2}$  inch wide, pubescent on both surfaces, but more sparingly above, paler beneath, petiole  $\frac{1}{12}$  inch long. Stipules lanceate, subulate. Male flowers minute in small tufts of 2 or 3 together, pedicel filiform,  $\frac{1}{8}$  inch long. Sepals purple, triangular, acuminate, lacerate four. Disc of four separate glands, Stamens 4, anthers subglobose, smooth. Female flowers, sepals as in males. Capsule  $\frac{1}{8}$  inch wide subglobose, top flattened, slightly pale brown, minutely pustular, scabrid borne on a slender pedicel half an inch long.

Perlis near Kanga, Ginting Kabok (15188).

This is allied to *P. Wightianus*, Muell. Arg. of Southern India but the flowers are smaller and the fruit is not hirsute. The leaves are more equal-sided towards the ends of the branches than at the base.

*Phyllanthus* (§ *Reidia*) *concinna*, n. sp.

Shrublet about 4 feet tall, branches covered with hair (red when dry). Leaves oblong lanceolate to ovate lanceolate, usually inaequilateral, base broad, rounded, apex acuminate shortly, acute, glabrous above except the midrib, beneath paler downy  $2\frac{1}{2}$  inches long,  $\frac{3}{4}$  inch wide, petiole  $\frac{1}{20}$  inch long, hairy. Stipules lanceolate, acuminate, glabrous,  $\frac{1}{20}$  inch long. Male flowers in small axillary tufts with numerous pale, ovate, hairy bracts, with red tips; pedicels filiform,  $\frac{1}{4}$  inch long. Perianth

crimson  $\frac{1}{6}$  inch across, lobes triangular with long cilia, Stamens 4. Female flower solitary in the upper axile. Pedicels 2 inches long, hairy. Perianth as in the male but much larger, the lobes longer and narrower, a quarter of an inch across. Fruit globose, pale green, woolly,  $\frac{1}{4}$  inch long. Seed reniform, pale, back broad rounded, transversely minutely striate

Lankawi Telayah Tujoh in Burau Bay, abundant along the path to the seven wells, and on the rocks. A very pretty plant and worth cultivating.

*Actephila javanica*, Miq. Lankawi (Curtis). Distrib. Malay peninsula and Islands.

*Andrachne fruticosa*, Dec.

Lankawi small islands and Terutau (Curtis). Perlis, at the foot of the rocks, Tebing Tinggi, (14883), Bangtaphan (Keith), by wayside and in jungle.

Distrib. Perak, and the top of the Batu Caves, Selangor, (Ridley, 8203), also Timor Laut and Java.

This little branched shrublet seems to be a widely spread limestone rock plant. In the Perlis plant, the pedicels of the male flowers are much longer than the flowers nearly half an inch long, glabrous and fine as the finest pair. Hooker describes them as little longer than the male flower and hairy. The disc glands are as long as the small petals, linear, obtuse, and look more like staminodes. The Selangor plant has fleshier nearly glabrous leaves, possibly it is specifically distinct.

*Glochidion laevigatum*, Hook. fil. Puket (Curtis), Bangtaphan (Keith), Lankawi, Kwah (Curtis), Kedah, Alor Sta (14894).

Distrib. Tenasserim to Singapore.

*Gl. desmogyne*, Hook. fil. Kedah, Alor Sta, Lankawi, Kwah (Curtis, 2558).

Distrib. Tenasserim, and Peninsula.

*Gl. perakense*, Hook. fil. Perlis, near Bukit Telor Jambu, Kanga (14893). Distrib. Malay peninsula.

*Gl. brunneum*, Hook. fil. Perlis, near Kanga, (14892.)

Distrib. Malay peninsula.

*Gl. insulare*, Hook. fil. Kedah, Alor Sta (14891 and 14894). Lankawi, Kwah (Curtis). Distrib. Malay peninsula.

*Gl. Llanosi*, Muell (*Phyllanthus Llanosi*, Muell. Arg).

Lankawi (Curtis, 2130). Perlis, Ginting Kabok (14895), Bangtaphan (Keith).

This plant only previously recorded from the Philippines is abundant and conspicuous over this region. It is exactly similar to a specimen of Cuming's Philippine plants No. 595, on which Mueller based his species. The plant is a low softly hairy shrub about 2 feet tall with bright green leaves, and showy orange yellow fruits.

*Gl. flavum*, n. sp.

Small tree, branches angled, pale green, slender. Leaves lanceolate, acuminate at both ends, thinly coriaceous, drying pale green, grey above, light green beneath, 2 inches long,  $\frac{3}{4}$  inch wide, glabrous, nerves 5 pairs, pedicels hardly  $\frac{1}{8}$  inch long. Flowers male in short axillary tufts with ovate red bracts, pedicels  $\frac{1}{10}$  inch long, sepals 5, oblong acuminate, beaked, yellow,  $\frac{1}{8}$  inch long, Petals 5, linear, shorter and very narrow obtuse. Stamens 3, filaments connate into a pillar, anthers oblong ovate, the connective prominent at the back and prolonged into a horn, acuminate, spotted red, nearly as long as the anther. Female flowers and fruit not seen.

Lankawi Gunong Raya (Aniff).

*Gl. microphyllum*, n. sp.

Tree, Leaves small, elliptic with a rounded base, apex obtuse, thinly coriaceous, drying grey,  $1\frac{1}{2}$  inches long,  $\frac{1}{2}$  inch wide or smaller,  $\frac{1}{2}$  inch long by  $\frac{1}{4}$  wide. Branch-

lets pubescent. Flowers 4 or 5 in small tufts, axillary on pedicels  $\frac{1}{12}$  inch long, very small. Sepals 2, lanceolate, acute. Petals 3, orbicular broader. Stamens 5, 3 in a column with 2 smaller ones apparently abortive. Anthers oblong, appressed together, no pistillode. Female flowers rather larger on longer pedicels, sepals and petals similar. Fruit sub-globose with a flattened top, not lobed, smooth  $\frac{1}{8}$  inch through.

Perlís at Kanga, (15232). A very small leaved species looking like a *Breynia*.

*Gl. obscurum*, Bl. Bangtaphan (Keith).

Distrib. Malay peninsula and islands, and China.

*Breynia coronata*. Lankawi (Curtis, 2555). Distrib. peninsula.

*Breynia Keithii*, n. sp.

A shrub, branches smooth, brown, branchlets rather close. Leaves alternate, elliptic, obtuse or subacute, glabrous, black when dry and glaucous beneath,  $\frac{3}{4}$ -1 inch long,  $\frac{1}{2}$  inch wide, nerves 4 pairs, petiole  $\frac{1}{8}$  inch long or less. Male flowers not seen. Female flowers 3 together, cymose shortly pedicelled, minute. Bracts linear, acuminate, setaceous minute. Calyx cupular, entire in flower. Fruit small, globose,  $\frac{1}{8}$  inch long when dry, pedicel equally long, apex not-flattened, terminated by 3 short setaceous styles. Calyx split into 5 unequal, ovate, triangular, acute lobes, more than half the width of the fruit, seed 2 in each cell, yellowish white, finely pubescent, outer face broad, rounded, inner face, forming an acute angle.

Kedah, Alor Sta (14888), Setul at Bukit Bunga (14887).

This differs from the common *Breynia reclinata*, in its smaller leaves and flowers and small fruit with the 5 lobed calyx, and pubescent seed. In *reclinata* the calyx shews obscure signs of lobing, but in *B. minor*, the lobes are quite distinct and acute.

*Breynia angustifolia*, Hook. fil. Bangtaphan (Keith). "Fruit scarlet, enlarged sepals purple.

Distrib. Tenasserim to Perak.

*Breynia*, sp.

A shrub with ovate coriaceous leaves, bluntly acuminate, base cuneate, nerves 5 pairs, 2 inches long, 1 inch across. "Petals and ovary green, Male perianth tubular yellow, Capsule globose with broad enlarged sepals, "outer coat of carpels (? sepals) gets yellow colored leaving red endocarp enclosing seeds."

Bangtaphan, grows in large (bushes) on the shore, (Keith).

This species is only represented in the herbarium by a spray with rather crushed fruits. Its coriaceous leaves make it very distinct but it is hardly complete enough to name.

*Fluggea microcarpa*, Bl. Lankawi (Curtis).

Distrib. Tropical Africa and Asia to Australia.

*Sauropus quadrangularis*, Muell.? A poor specimen of a plant from Bangtaphan collected by Dr. Keith is I think this. Distrib. India, Burmah.

*S. pubescens*, Hook. fil. A small shrub 3 feet high. Flowers purple in Bamboo jungle, Bangtaphan (Keith). Distrib. India.

*S. parvifolius*, n. sp.

A slender-branched shrub, about 3 feet tall, with pubescent, angled branchlets. Leaves alternate, obovate, obtuse, base cuneate, herbaceous, beneath glaucescent,  $\frac{3}{4}$  inch long,  $\frac{1}{2}$  inch wide, petiole slender,  $\frac{1}{10}$  inch long, all glabrous, stipules linear, subulate, entire, Male flowers on very short racemes covered with ovate, acute bracts, pedicels filiform,  $\frac{1}{8}$  inch long. Perianth  $\frac{1}{8}$  inch across or little less, sepals connate, flat with 6 oblong obtuse lobes, pubescent beneath,



Stamens 3 in a short column, Anthers deflexed. Female flowers solitary in a terminal axil, larger than the males. Sepals longer, oblong truncate, pubescent. Styles short, bifid recurved on the slightly flattened top of the ovary. Fruit small,  $\frac{1}{4}$  inch through, when dry globose whitish, thin walled, styles in a circle on a flattened disc at the top of the ovary.

Kedah Alor Sta (15187).

*Sauropus albicans*, Bl. This plant the well known Chekop manis of the Malays cultivated as a vegetable, is not wild in the peninsula. I add some notes of it to supplement the account in the Flora of British India. The young leaves dark, dull green, are often splashed with grey. The male flowers are described as "disciform, 6 lobed, lobes broad." The perianth is disc shaped with six short angles, and in the centre round the column of stamens are six short free points of a darker red usually than the rest. It appears to me that the perianth lobes are reflected on themselves, and their upper and lower surfaces respectively connate, only the tips in the centre of the disc being free. I can see nothing that can be described as broad lobes. The flower is at first green becoming more and more spotted with pink till it is quite dark-pink by the time the stamens have shed their pollen. The female flower is cup shaped and purple. The fruit is either white or rose-pink, and the false aril white and slightly sweet.

*Aporosa Praineana*, King. Lankawi, Gunong Raya (Aniff).

Distrib. Malay peninsula.

*A. microcalyx*, Hassk, Kedah, Alor Sta, Perlis, Kanga.

A large leaved form.

Distrib. Malay peninsula, Archipelago, and China.

*A. Maingayi*, Hook. fil. var? Tongka, Gunong Toxai (Curtis, 2919).

A single specimen in fruit. The fruit is larger than usual, hairy outside, glabrous within; the young petioles are hairy, the variation of the leaves less marked. It may be a distinct species.

*Daphiphyllum laurina*, Baill. A shrub with yellow flowers. Setul heaths (14963).

Distrib. Malay peninsula, Sumatra, Java.

*Antidesma Ghaesembilla*, Gaertn. Perlis, Kanga (14914), Setul (14913), Bangtaphan (Keith).

Very common shrub or small tree in thickets in the paddy fields.

Distrib. Africa to Indo-Malaya and China.

*A. Moritzi*, Muell. Arg. Setul (14912), Lankawi (Curtis, 2529), Burau (Ridley).

Distrib. Mergui, whole peninsula and islands to the Philippines.

*A. cuspidatum*, Muell. Arg. Kedah, Alor sta (14911), Perlis, Chupeng (14906).

Distrib. Tenasserim to Singapore.

*A. velutinosum*, Bl. Lankawi, Gunong Raya (Curtis). Distrib. Tenasserim to Peninsula and Java.

*Antidesma*, sp.

Leaves oblong, acuminate, base broad, rounded, coriaceous, 7 inches long, 4 inches wide, nerves 11 pairs, glabrous, petiole stout, half an inch long. Female flower-spike  $\frac{3}{4}$  inch long, rufous woolly, all but the pistil. Drupes reniform, rugose when dry,  $\frac{3}{8}$  inch long.

Lankawi (Ridley 8344), near *A. Kingii*, Hook. fil. but with more glabrous petiolate leaves.

*A. velutinum*, Tul. Lankawi, Gunong Raya (Aniff). Distrib. India.

I conclude this is correctly identified from description, but have seen no other specimen.

*Baccaurea parviflora*, Muell. Kedah, Alor Sta on Bukit Pinang (14915), Tongka, Gunong Toxai (Curtis).

Distrib. Tenasserim to Singapore, Sumatra.

*Hymenocardia punctata*, Wall. Trang (Kunstler).

Distrib. Tenasserim to Perak.

*Galearia phlebocarpa*, Br. Kedah, Bukit Pinang near Alor Sta, Setul, Bukit Rajah Wang.

Distrib. Tenasserim to Singapore.

*G. subulata*, Muell. Lankawi, Kwah (Curtis), Tongka, Gunong Toxai. Distrib. Penang.

*Microdesmus casearifolia*, Planch. Lankawi (Ridley), Kedah, Alor Sta (15213), Perlis, Tebing Tinggi (15212).

Distrib. Burmah, Malay peninsula, Borneo, China.

*Croton Cumingii*, Muell. Arg. Perlis, Chupeng, Lankawi by the lake; Bangtaphan (Keith). Distrib. Malay peninsula and Philippines.

Distrib. limestone rocks, Pahang, Perak.

*C. caudatus*, Geisel. Kedah, Bukit Pinang, Alor Sta (14938). Distrib. Indo-Malaya.

*C. Griffithii*, var. Bangtaphan (Keith). Distrib. Malay peninsula.

*Dimorphocalyx ovalis*, n. sp.

Shrub glabrous, branchlets with longitudinally wrinkled bark, brown, shoots with yellow pubescence. Leaves thinly coriaceous, opposite or subwhorled at the ends of the branches, drying green, lanceolate, acuminate, acute, base cuneate, blunt, margin slightly thickened, often obscurely undulate, glabrous except for a few hairs occasionally at the base, midrib prominent, lateral nerves about 14 pairs, meeting in loops, well within the margin, reticulations fine, conspicuous when dry, 3-6 inches long, 1-2 inches wide, petiole  $\frac{1}{10}$ - $\frac{1}{8}$  inch long, thickened, wrin-

kled, Female flowers on pedicels  $1\frac{1}{2}$  inch long, slender. Bracts in fruit 5, ovate obtuse,  $\frac{5}{8}$  inch long, half an inch wide, bright green, quite glabrous. Fruit globose, black, covered with very small white hairs, half an inch through. Styles separate. Disc entire, annular, ovary conic pubescens.

Perlis woods at Bukit Telor Jambu, Kanga (14890), Lankawi, Kwah (Curtis).

This differs from *D. capillipes*, Hook. in the sepals in fruit being ovate blunt and nearly equal, and from *D. Kunstleri* in the thinner broader leaves, and broader rounder fruiting sepals as well as the long slender pedicel.

*Claoxylon indicum*, Hassk. Terutau (Curtis), Perlis, Chupeng (14937).

Distrib. Tenasserim, China, Malay peninsula and islands.

*C. molle*, Miq. Perlis, Kanga, (14903). Possibly a form of *C. indicum*. Distrib. Malaya.

*Cl. longifolium*, Miq. Lankawi, Gunong Raya (Aniff). Distrib. Indo-Malaya.

*Acalypha fruticosa*, Forsk. Very abundant on hill sides, Bangtaphan (Keith).

Distrib. Africa, India to Ava, Ceylon, Malay peninsula.

*A. fallax*, Muell. Arg. Perlis, Tebing Tinggi (14907). Distrib. India and Malaya.

*Caelodiscus montanus*, Muell. Kedah, Alor Sta, Gunong Geriang, (14904), Lankawi (Curtis), Bangtaphan (Keith).

Distrib. Malay peninsula.

*Trigonostemon longifolius*, Baill. Lankawi, Sandy woods at Burau. Distrib. Malay peninsula.

*Adenochlaena siamensis*, n. sp.

Shrub 3 to 5 feet tall. Leaves alternate, lanceolate, acuminate, base rounded, margins strongly and coarsely toothed, above glabrous, drying black beneath, densely white stellate tomentose penninerved 5 to 9 pairs of nerves, 7 inches long, 4 inches wide, subpeltate, petiole 1-2½ inch long, geniculate, densely stellate, woolly. Stem densely woolly. Male inflorescence of one or more small capitula, on short (¼ inch) stout axillary peduncles, densely woolly. Capitulum ⅙ inch through of many sessile flowers. Sepals 4, ovate, acute, hairy. Stamens 4, glabrous, filaments longer than the sepals. Anthers elliptic 2 celled. Pistillode cylindric obtuse, glabrous, half as long as the filaments.

Terutau (Curtis, 2112); Perlis dense thickets by limestone rocks near Ginting Kabok; Bangtaphan (Keith).

The genus not previously recorded from the peninsula but occurring in India and Malay islands.

*Mallotus barbatus*, Muell. Kedah Alor Sta.

Distrib. Tenasserim, Malay peninsula to Singapore Concan and Java.

*M. macrostachyus*, Muell. Trang (Fox).

Distrib. Malay peninsula and Islands.

*M. Helferii*, Muell.? Perlis, Tebing Tinggi (14898).

Distrib. Tenasserim to Malacca.

*M. floribundus*, Muell. Setul, Bukit Rajah Wang (14935). Bangtaphan (Keith).

Distrib. Tenasserim, Malay peninsula, Cochin-China and Malay islands to Celebes, Samoa.

*M. subpeltatus* Muell. Perlis, Tebing Tinggi, Lankawi, Burau (Ridley).

Distrib. Malay peninsula, Sumatra, Java.

*M. Griffithianus*, Hook. fil.? Lankawi (Curtis, 2656).

Distrib. Malay peninsula.

*M. repandus*, Muell. Perlis, Bukit Lagi (14936).

Distrib. India, Ceylon, Malay peninsula and Islands, China, New Caledonia.

*Mallotus cuneatus*, n. sp.

Branches red brown, flattened, dilated upwards, scabrid. Leaves opposite, unequal, obovate or sub-rhomboid, acuminate, coarsely and irregularly toothed, base cuneate, blunt, herbaceous, nerves two from the base, above 4 pairs spreading, nervules horizontal, conspicuous, all meeting in an intramarginal nerve, above glabrous, beneath pubescent on the nerves, and especially the midrib, minutely pellucid punctate, with two glands on the base of the basal nerves on the upper surface. Biggest leaf 7 inches long, 4 inches wide, smaller 4 inches long by 2 inches wide. Racemes axillary, very slender. Males about 5 inches long, pubescent. Flowers  $1\frac{1}{2}$  inch across, three or four together with small ovate, acuminate bracts. Sepals 3, ovate, acute, hairy. Stamens numerous, short, crowded. Females spikes, 3 inches long, pubescent, flowers solitary, sepals as in males. Ovary grey hairy. Stigmas short, thick, plumose recurved, red, on a short thick style. Capsules trilobed,  $\frac{1}{4}$  inch across, green hairy with stellate tufts of hairs, sprinkled over with short black processes and minutely glandular, shortly stalked. Seeds subglobose, smooth, blackish brown.

Perlis, Bukit Lagi. Flowers white (15190).

*Gelonium tenuifolium*, n. sp.

Tree, Leaves alterriate thin, membranaceous, glabrous, elliptic, acuminate, acute, base cuneate, nerves 6 pairs, transverse nerves conspicuous, 7 inches long,  $3\frac{1}{2}$  inches wide, petiole  $\frac{3}{8}$  inch long. Flowers in short axillary tufts, rachis stout,  $\frac{1}{10}$  inch long, 2 or 3 flowers together. Males  $\frac{1}{4}$  inch across on a short thick pedicel. Sepals 3, thick ovate, petals 2, spathulate with thin margins, ciliate.

Stamens 30, filaments slender, anthers narrowly oblong, acute, disc hairy. Females, perianth similar stigma capitate. Fruit  $\frac{1}{4}$  inch through, globose, obscurely grooved, 3 celled white.

Lankawi at Burau.

This *Gelonium* differs from our other species in the much thinner and larger leaves. It is perhaps nearest to *G. glomerulatum*, Hassk. I have a specimen of a *Gelonium* somewhat resembling this in foliage from New Guinea.

*Cleidion javanicum*, Bl. Setul, Bukit Rajah Wang (14900).

Distrib. India to Tenasserim, Java.

*Macaranga tanarius*, Muell. Perlis, Tebing Tinggi, (14902), Bangtaphan (Keith).

Distrib. Andamans, Malay peninsula and Islands.

*M. denticulata*, Muell. Kedah, Alor Sta (14901).

Distrib. Sikkim to Tenasserim and Malay peninsula.

*Homonoia riparia*, Lour. Bangtaphan (Keith), Lankawi Kesap (Aniff).

Distrib. India, Malay peninsula, Java.

*Chaetocarpus castanocarpus*, Thw. Lankawi (Ridley, 8311), Setul (14939).

Distrib. Silket and Chittagong, Andamans to Penang and Province Wellesley.

*Baliospermum axillare*, Bl. Perlis, Ginting Kabok, (14905), Bangtaphan in damp places (Keith).

Distrib. Kashmir, Assam, Tenasserim, Deccan, Malay peninsula, Java and Sumatra.

*Tragia involucrata*, L. var. Kanga, (15230).

Distrib. India, Burmah, China.

*Sapium indicum*, Willd. Kedah, Alor Sta, very common. Perlis, Kanga.



Distrib. Sunderlands to Tenasserim, Malay peninsula.

*Excoecaria agallocha*, L. Lankawi (Curtis).

Distrib. India, Malay peninsula to Polynesia.

*E. quadrangularis*, Muell. Arg. Bangtaphan (Keith).

Distrib. Malay peninsula.

*Sebastiania Chamaelea*, Muell. Setul, common.

Distrib. India to Burmah, Malay peninsula, China, Malay islands, Australia and Africa.

#### URTICACEÆ.

*Trema amboinensis*, Bl. Bangtaphan (Keith).

Distrib. Tenasserim, Malay peninsula to Australia.

*Phyllochlamys Wallichii*, King. Lankawi, Kwah (Curtis), Kedah, Alor Sta (14955), Perlis, Kanga (14956), Bangtaphan (Keith). A very common prickly leaved bush.

Distrib. Penang and Perak.

*Streblus asper*, Lour. Kedah, Bukit Pinang (14948 & 14849), and Gunong Geriang near Alor Sta, Perlis, Kanga (14953), Lankawi (Ridley, 8321), Puket (Curtis).

Distrib. Indo-Malaya, Cochin-China, only as far South as Penang.

*Ficus infectoria*, var. *caulocarpa*, Lankawi, Kwah (Curtis). A large fruited plant which somewhat resembles *F. Tsiela*, Roxb. a big tree occurred in the Kanga village at Perlis.

Distrib. Indo-Malaya.

*F. sumatrana*, Miq. Kedah, Gunong Geriang (14945). Distrib. Malay peninsula and islands.

*F. indica*, L. Lankawi, Kwah (Aniff). Distrib. Indo-Malaya.

*F. procera*, Miq. Lankawi (Curtis, 2609).

*F. glabella*, Bl. Bangtaphan (Keith). Distrib. Himalayas, Burmah and Malay peninsula.

*F. retusa*, L. Perlis, Kanga.

Distrib. India, China, Peninsula and islands.

*F. obtusifolia*, Roxb. Lankawi, (Curtis, 2639).

Distrib. India to Malay peninsula.

*F. quercifolia*, Roxb. Pungah (Curtis), var. *humilis*, Trang at Chong (Native).

Distrib. Burmah, Malay peninsula.

*F. Miquelii*, King. Lankawi (Curtis), Bangtaphan (Keith).

Distrib. Pegu to Malay peninsula and islands.

*F. hispida*, Linn. f. Bangtaphan (Keith).

Distrib. India, Malaya, China, Australia.

*F. chartacea*, Wall. Lankawi (Ridley). Distrib. Malay peninsula.

*Cudrania javanensis*, Trecul. Perlis, Batu Hangat Besih (14950).

Distrib. Africa, India, Malay islands, Australia.

*Artocarpus Lakoocha*, Roxb. Lankawi, Kwah (Curtis), Trang, Thap Tiang (Fox), Native name "Lokhat."

Distrib. India to Malay peninsula.

*Balanostreblus ilicifolia*, Kurz.

Trang (Kurz). Distrib. Chittagong, Ava and Malay peninsula, South to Pahang.

*Conocephalus Scortechinii*, King. Perlis, Telor Jambu.

Distrib. Malay peninsula.

*Fleurya interrupta*, Gaud. Kedah, Gunong Geriang.

Distrib. all old world tropics.

*Laportea crenulata*, Gaud. Bangtaphan (Keith), Kedah, Gunung Geriang (14954).

Distrib. India, Ceylon, Malay peninsula and islands.

*Pilea minutiflora*, n. sp.

Stems several, erect, succulent, 18 inches tall,  $\frac{1}{4}$  inch through, internodes dilated towards the centre, olivaceous, glabrous. Leaves opposite, somewhat unequal, ovate, acute serrate, pale green, glaucous, 3 nerved, 5 inches long,  $2\frac{3}{4}$  inches wide, petiole 3 inches long. Stipules caducous, very small, lanceolate, acuminate, edged purple red. Panicles half an inch long with few branches under half an inch wide, flowers numerous on the upperside of the branches, Males few together in the axils of the branches, pale greenish white, shortly pedicelled, Perianth lobes four, oblong, connate at the base,  $\frac{1}{10}$  inch long. Stamens 4, filaments pale green, flat nearly as long as the perianth, anthers elliptic with two semicircular white cells with an intermediate green connective. Pistillode minute. Female flowers much smaller, Perianth utricular with 4 short teeth. Pistil cylindric, conic with five or six short styles.

Trang (coll. Md. Aniff.) cultivated in the Botanic Gardens, Singapore, 1910.

*Pellionia javanica*, Wedd. Setul, Bukit Rajah Wang (14951), Bangtaphan (Keith).

Distrib. Malay peninsula.

This species was based on a plant labelled "Java Lobb." Lobb collected in Singapore, Penang, Java and Borneo, and the localities were so mixed in distribution that a large proportion were affixed to the wrong plant. Hooker (Flora of British India) suggests that Lobb got this plant in Singapore, but it does not occur here and apparently is absent from Java, and no doubt its locality

should be Penang, where it is not uncommon. I have not seen Lobb's specimen, but Curtis' plants from Penang are quoted by Hooker, and no doubt are the same as the type.

The plant has long been cultivated in Singapore, Hooker gives it as "quite glabrous," but plants cultivated in Singapore are distinctly hairy on the midrib on the back, at least in some cases. He says also female cymes much branched, very long peduncled. I find the female cymes though much branched sessile, that is to say not on long peduncles. The males however are often long peduncled, but often short peduncled or almost sessile. Some of the male cymes at least have female flowers mixed with the males.

The plant has a creeping rhizome, the leaves are stiff, smooth and dark green, glabrous above, pale beneath, and with adpressed hairs on the midrib, otherwise glabrous, the sides of the leaf at the base pinched up, but not peltate as in the next plant. The flowers are shortly stalked, and the perianth lobes oblong and somewhat ciliate, green with often pink tips. The achene is rose pink, with a white edge and a few white pustules. It is widely scattered over the hill woods as far South as Johor, and seems to me very variable. The leaves vary from 3 inches long and 1 inch broad to 8 inches long and 3 inches wide. The midrib at least on the back is almost always covered with appressed hairs, as are frequently the nerves and sometimes the petiole. The petiole varies in length from  $\frac{1}{2}$  to 6 inches. The stem is often tall with a long, creeping rhizome, sometimes short and only shortly creeping, and has been mentioned the inflorescence varies very much.

*P. acaulis*, Hook. fil. Is I am sure only a local variety. It is much more compact with shorter petioles, rather more hairy with longer hairs on the nerves and petiole. The inflorescence is compact and I have never seen it

spreading as it does in well grown plants of typical *P. javana*. The structure of the flowers and the form of the achene is identical. *P. acaulis*, is a native of Penang and has long been in cultivation in Singapore Botanic Gardens, where it has spread on the rock tables like the other species. It seems, however to maintain always its dwarf form, I would propose to call it therefore. *P. javanica* var. *acaulis*.

A more distinct variety is the following which was sent some years ago to the Botanic Gardens, Singapore from Penang and obtained originally on the East Coast of Siam somewhere I believe in the region of Trang.

*Pellionia javanica* var. *pulcherrima*, Stem creeping, Leaves oblique lanceolate, acuminate, base oblique peltate, margin entire, bullate, dark green mottled, lighter beneath pale, nerves elevated, pubescent, 6 inches long,  $2\frac{1}{2}$  inches wide, petiole  $1-1\frac{1}{2}$  inch long, stipules lanceolate, caudate,  $\frac{1}{2}$  inch long. Peduncle 3 inches long, stout, succulent red, branches four, dichotomous,  $1-1\frac{1}{4}$  inch long, densely floriferous. Male flowers  $1\frac{1}{2}$  inch across. Perianth lobes 4, oblong, pale green, tinted pink. Stamens 4, anthers short, pale pink, filaments thick, pale green. Females in a sessile head,  $\frac{1}{2}$  inch through, perianth green on pedicels as long as the perianth, lobes 4, acute, pubescent. Achene flattened, obovoid, shortly beaked, violet with a white elevated margin.

East Lower Siam, exact locality doubtful.

This has been for some time cultivated in Singapore being introduced by Mr. Curtis.

It is certainly closely allied to *P. javanica*, Wedd. the Penang plant, but the leaves are more fleshy, bullate, and of a different color, the nerves on the underside are more hairy. The inflorescences male, female and mixed are similar to those of *P. javanica*, and the flowers are quite similar. The achenes, however are not distinctly

tubercled. They are minutely papillose as in *P. javanica*, of the same shape or very nearly so, and nearly of the same color, but I see none of the raised lumps which are to be seen in the other species.

*P. Helferiana*, Wedd. of Tenasserim is very incompletely described, and may from the description be a variety of *P. Javanica*.

*P. Durauana* N. E. Br. var. *viridis*, Setul, Bukit Rajah Wang (15215). Distrib. Pegu and the whole of the Malay peninsula, as far South as Negri Sembilan, on banks in hill woods.

*Elatostemma*, sp. Bangtaphan, (Keith).

*Procris frutescens*, Bl. Lankawi, Gunong Rayah (Curtis). Distrib. Malay peninsula and islands.

*Pouzolzia pentandra*, Barn. Lankawi (Curtis), Setul, Rajah Wang, Bangtaphan (Keith). Distrib. Indo-Malaya, China.

#### CUPULIFERÆ.

*Quercus spicata*, Sm. Kedah near Bukit Penang, Alor Sta (14960), Lankawi, Kesap (Aniff), Burau woods (Ridley).

Distrib. India, Malay peninsula and islands.

*Castanopsis tribuloides*, Dec. The typical form with entire leaves, pale beneath. Setul. Distrib. India and Burmah.

#### CASUARINÆ.

*Casuarina equisetifolia*, Br. Bangtaphan. A small Colony beside the temple of Ao Yong, mouth of a stream at the beach. (Keith). Pulau Adang.

#### GNETACEÆ.

*Gnetum tenuifolium*, n. sp. A slender climber over bushes. Leaves opposite, oblong, lanceolate, acuminate, usually with a long point, thin textured, narrowed at the base, nerves

6 to 8 pairs, raised beneath, interarching well within the margin, reticulations inconspicuous, 4 to 7 inches long, 1 to  $2\frac{1}{4}$  inches wide, petiole  $\frac{1}{4}$  inch long, Male spikes solitary or 2 together on the stem, simple, on peduncles an inch long, slender with a pair of connate, acuminate bracts,  $\frac{1}{10}$  inch long, pedicel of spike half an inch long, slender, spike an inch long,  $\frac{1}{8}$  inch through. Female spike solitary on a shorter, thicker peduncle, simple, 2 to 3 inches long. Ovules in whorls of 8 to 10, one eighth of an inch apart, surrounded by short brownish hairs, with a cup shaped bract below. Seed spikes 4 inches long. Unripe seed acuminate, and when dry narrowed at the base; ripe ellipsoid with a short acute point on a slender pedicel half an inch or more long. Seed (without pulp) ellipsoid, acute, finely ribbed, half an inch long.

Lankawi (8341), Kasum (Curtis, 3244). This occurs all over the peninsula as far south as Malacca, and is remarkable for its thin twining stems, only  $\frac{1}{8}$  inch through, thin leaves and long pedicelled fruits.

*G. funiculare*, Bl. Lankawi at Kesap (Aniff). Distrib. Burmah, Assam and Malay peninsula.

*G. macrostachyum*, Hook. fil. Pulau Adang. Distrib. Malay peninsula.

#### CYCADEÆ.

*Cycas rumphii*, Miq. Sea shores Pulau Adang.

Distrib. Tenasserim, Malay peninsula, Andamans, Malay islands, Australia.

*C. siamensis*, Miq. Setul and Perlis, Tebing Tinggi (Ridley). Terutau (Curtis, 2427) on limestone rocks high up.

Distrib. Burma, Prome, Shan States, Siam and Cochin-China.



## MONOCOTYLEDONES.

## HYDROCHARIDÆ.

*Ottelia alismoides*, Pers. Lankawi at Kwah (Curtis).

Distrib. Trop. Africa, Asia and Australia.

*Halophila ovata*, Gaud. Lankawi (Ridley).

Distrib. Indian Ocean.

## ORCHIDÆ.

*Microstylis calophylla*, Rehb. fil. Kasum, on low hills (Curtis).

Distrib. Pegu and Penang.

*M. prasina*, Ridl. Tongka (Native collector). Punga (Curtis). Endemic.

*M. macrocheila*, Rolfe. Pungah (Curtis), introduced to Kew in 1895 with *M. prasina*, Ridl. Endemic.

*M. congesta*, Rehb. fil. Lankawi (Curtis). Setul.

Distrib. India, Cambodia, Borneo to Australia.

*Oberonia iridifolia*, Lindl. Lankawi, Pulau Hujung Duri, (Curtis).

Distrib. India and Siam.

*O. prainiana*, Hook. fil. Kasum (Curtis, 3230).

Distrib. Malay peninsula, Sikkim.

*O. saururus*, n. sp.

Stemless, leaves ensiform falcate about 4, the largest 6 inches long by 1 inch wide, the others smaller. Raceme slender, 13 inches long, bracts lanceolate, appressed and nearly covering the base. Flowers very numerous, small, pale whitish not whorled. Floral bracts lanceolate, oblong, shorter than the stout pedicel and ovary. Sepals lanceolate, subacute. Petals oblong, entire, shorter, obtuse. Lip oblong, the two upper angles prolonged into short

broad toothed lobes, midlobe oblong with a bifid apex, points divaricating with a broad sinus between. Column short, stout, ovary, angled, thick.

Kasum (Curtis, 3231), Nov. 1896.

Remarkable for its very long rat-tailed spike.

*Liparis Downii*, Ridl. Journ. S. Br. R. As. Soc. 49, p. 27.  
Southern Siam (Down).

*L. lacerata*, Ridl. Lankawi, Gunong Raya (Curtis).

Distrib. Tenasserim, Perak, Borneo.

*L. elegans*, Lindl. Lankawi, Kwala Malacca (Curtis, 1695).

Distrib. Malay peninsula, Borneo.

*L. flaccida*, Rehb. fil. Kasum (Curtis, 3225).

Distrib. Malay peninsula, Sumatra, Java, Borneo.

*L. disticha*, Lindl. Lankawi (Curtis).

Distrib. Mascarene islands, Ceylon, Tenasserim, Peninsula, and Islands.

*Dendrobium denudans*, Roxb. Kasum (Curtis).

Distrib. India to Sikkim.

*D. eriaeflorum*, Lindl. Kasum, abundant on small hills near the village (Curtis). Distrib. India to Sikkim.

*Dendrobium quadrangulare*, Rehb. f. Setul.

Distrib. Burmah and Malay peninsula.

*D. Keithii*, Ridl. Bangtaphan (Keith), Pungah (Curtis).  
Endemic.

*D. pallidiflorum*, Ridl. Lankawi, Kwah (Curtis). Endemic.

*D. bifidum*, Ridl. Lankawi (Curtis). Endemic.

*D. flabellum*, Rehb. f. Ghirbee (Curtis), Trang (Goldham).

Distrib. Malay peninsula, Borneo.

*D. eulophotum*, Lindl. Lankawi, Kwah (Ridley), Terutau (Curtis). Setul, var. with pure yellow flowers, Pungah, (Curtis).

Distrib. Tenasserim, whole peninsula, Borneo and Java.

*D. atropurpureum*, Miq. Singgora, Pungah (Curtis).

Distrib. Tenasserim, Siam, Malay isles.

*D. leonis*, Rechb. fil. Perlis, Ginting Kabok near Kanga.

Distrib. whole peninsula.

*D. revolutum*, Lindl. Kasum (Curtis), near the village.

Distrib. Tenasserim, Malay peninsula.

*D. acerosum*, Lindl. Bangtaphan (Keith).

Distrib. Tenasserim, Malay peninsula, Borneo.

*D. albicolor*, Ridl. Pungah (Curtis). Endemic.

*D. trinervium*, Ridl. Pungah (Curtis). Endemic.

*D. pachyglossum*, Par. Lankawi, Gunong Raya (Curtis).

Distrib. Tenasserim, Kedah and Perak.

*D. gemellum*, Lindl. Lankawi (Curtis), Trang (Goldham), Bangtaphan (Keith).

Distrib. Siam, Sumatra to Borneo, Peninsula.

*D. pandaneti*, Ridl. Pungah, (Curtis, 3233).

Distrib. Malay peninsula and Sumatra.

*D. crumenatum*, Sw. Perlis, Common near Kanga, Bangtaphan (Keith). Kedah, Alor Sta.

Distrib. Burmah, Andamans, China, Malay peninsula and islands to Christmas islands.

*D. inconinum*, Ridl. Pungah (Curtis). Endemic.

*D. tuberiferum*, Hook. fil. Kopah (Curtis).

Distrib. Malay peninsula, Java.

*D. gracile*, Lindl. Kasum, common on some of the limestone rocks, (Curtis).

Distrib. Singapore, Borneo, Java.

*D. (§ Pedilonum) secundum*, Lindl. Perlis, between Alor Sta and Kanga, Ginting Kabok (14977) Setul, Pungah (Curtis), Terutau (Curtis).

Distrib. Cochin-China, Burmah to Philippines.

*D. hymenopterum*, Hook. fil. Lankawi, Gunong Raya (Curtis).

Distrib. Pahang, Perak and Kedah.

*D. calicopsis*, Ridl. Lankawi (Curtis). Endemic.

*D. Eoum*, Ridl. Kopah (Curtis). Endemic.

*D. Lankawiense*, Ridl. Lankawi (Native collectors). Endemic.

*D. tenuicaule*, Ridl. Lankawi, Ayer Hangat (Curtis). Endemic.

*D. viridulum*, Ridl. Pungah (Curtis). Endemic.

*D. cruentum*, Rehb. f. Tongka; Kopah (Curtis). Endemic.

*D. lamellatum*, Lindl. Kopah (Curtis).

Distrib. Moulmein, Malay peninsula, Borneo, Java.

*D. Farmerii*, Paxt. Pungah (Curtis). Rare.

Distrib. India, Burmah.

*D. aggregatum*, Roxb. Pungah (Curtis), Chantabun (Keith).

Distrib. Assam, Burmah, Siam, China, Perak?

*D. tortile*, Lindl. Kasum, not common (Curtis).

Distrib. Burmah, Tenasserim.

*D. lituiflorum*, Lindl. Shady rocky places on bare rock Bangtaphan (Keith). Also an "epiphyte, pendant forming rich masses of flower, odoursweet but faint; although the flowers are abundant, they are not attractive, the eye has to pick them out" (Keith).

*Bulbophyllum fascinator*, Setul (Curtis). Endemic.

This plant was figured in the Botanical Magazine from a plant, sent from Annam by Micholitz.

- B. macranthum*, Lindl. Lankawi, Burau, also in Pulau Adang. Distrib. Malay peninsula, Tenasserim, Sumatra, and Borneo.
- B. lilacinum*, Ridl. Lankawi, Niur Stali, Curtis. Distrib. Kedah Peak.
- B. roseum*, Ridl. Pungah (Curtis). Endemic.
- B. tenerum*, Ridl. Lankawi (Curtis). Endemic.
- B. pedicellatum*, Ridl. Pungah (Curtis). Distrib. Borneo.
- B. monanthos*, Ridl. Pungah, Kasum Road (Curtis). Distrib. Malay peninsula.
- B. citrinum*, Ridl. Kasum (Curtis). Distrib. Malay peninsula.
- B. vaginatum*, Ridl. Lankawi (Curtis). Distrib. Malay peninsula.
- B. gracillimum*, Rolfe. Lankawi (Curtis), Pungah (Curtis). Distrib. Malay peninsula.
- B. longissimum*, Ridl. Pungah (Curtis). Endemic.
- B. concinnum* var. *purpureum*. var. *brachysepalum*, Lankawi, Kwah (Curtis).

*Bulbophyllum* (*Cirrhopetalum*) *rapicolum*, n. sp.

Rhizome long with the pseudobulbs two inches apart. Pseudo bulbs conic, an inch long, covered at the base with the fibrils of the sheath. Leaves 6 inches long,  $1\frac{1}{2}$  inch wide, elliptic, blunt at the tip, narrowed at the base to the petiole, petiole an inch long. Scapes 3 inches long, rising close to the bulb with a sheath at the base and a linear leaf like bract nearly  $\frac{1}{4}$  inch long. Flowers in a whorl, 10. Bracts lanceolate, acuminate,  $\frac{1}{4}$  inch long. Pedicels  $\frac{1}{2}$  inch long, filiform, upper sepal ovate, acute or subacute, minutely mucronate, lower ones  $\frac{3}{4}$  inch long, connate at the tip the bases free, apex shortly two pointed. Petals not ciliate, half as long as the upper sepal, ovate, minutely denticulate, all closely spotted with rose pink. Lip tongue shaped, narrow, linear, obtuse, fleshy, column white, foot spotted pink.

Setul on rocks at Raja Wang, on the top of the hill.

*B. (Cirrhopetalum) Curtisii*, Bot. Mag. 7554, Pungah (Curtis).  
cultivated at Kew, resembles this species but the petals and  
upper sepal are strongly ciliated.

*Dendrochilum album*, Ridl. Pungah (Curtis). Endemic.

*Eria bractescens*, Lindl. Lankawi (Curtis).

Distrib. Tenasserim, Malay peninsula, Borneo.

*E. albido-tomentosa*, Lindl. Lankawi islands (Curtis), Tongka  
(Native); Kopah (Curtis).

Distrib. Java.

*E. ornata*, Lindl. Girbee, Pungah (Curtis).

Distrib. Philippines.

*E. rotundifolia*, Ridl. Lankawi on a tree at Prigi Tujoh,  
Burau. Distrib. Penang.

*E. cristata*, Ridl. Terutau (Curtis). Distrib. Penang.

*E. ochracea*, Rolfe. Kew Bulletin, 1909. Setul, Batu Bunga,  
collected by Aniff. Endemic.

*E. pendula*, Ridl. Lankawi (Curtis). Distrib. Malaya.

*E. floribunda*, Lindl. Terutau, Kasum (Curtis). Distrib.  
whole peninsula.

*Phreatia minutiflora*, Lindl. Setul. Distrib. Peninsula.

*Ph. listrophora*, Ridl. Lankawi, Gunong Raya. Distrib.  
Perak.

*Agrostophyllum Khasiyanum*, Pungah (Curtis). Distrib.  
India, Saigon.

*Spathoglottis Handingiana*, Par. and Rehb. f. Lankawi islands  
(Curtis). Distrib. Bhamo.

*Ascotania penangiana*, Ridl. Kedah, Gunong Geriang, plants  
brought to Singapore, flowered December 1910. Distrib.  
Penang.

*Cælogyne angustifolia*, Ridl. Lankawi (Curtis). Endemic.

- C. pachybulbon*, Ridl. Pungah (Curtis). Endemic.
- Pholidota imbricata*, Lindl. Lankawi (Curtis), Tonga (Native), Bangtaphan (Keith).  
Distrib. India, Sumatra, Java, Borneo.
- Calanthe rubens*, Ridl. Lankawi (Curtis), Perlis, Bukit Lagi (14976). Endemic.
- Arundina speciosa*, Bl. Trang (Goldham), Variety with white flowers. Flowers only seen. Distrib. Indo-Malaya.
- Eulophia graminea*, Lindl. Lankawi, Kwah (Curtis). Whole peninsula, India and Ceylon.
- E. Keithii*, Ridl. In cracks in limestone rocks, Kedah, Gunong Geriang (14973), Perlis, Bukit Lagi, Lankawi (Curtis), Bangtaphan (Keith). Endemic.
- Cymbidium aloifolium*, var. *pubescens*, Lankawi (Curtis), Perlis, Kanga (14969). Bangtaphan (Keith).  
Distrib. Malay peninsula, Borneo.
- C. ensifolium* var. *estriatum*, Lankawi, Kwah (Aniff).  
Distrib. India and China.
- Geodorum citrinum*, Jack. Pulau Hujung Duri, North of Lankawi (Curtis). Perlis near Ginting Kabok on the heath.  
Distrib. Burmah, Penang, Perak.
- G. purpureum* var. *album*, Lankawi (Curtis).  
Distrib. India, Malaya.
- Bromheadia palustris*, Lindl. Setul heath, a tall form.  
Distrib. whole peninsula to.
- Pachystoma senile*, Lindl. Setul Heaths. Flowers bright pink, lip yellow. A very pretty plant, the form with short bracts. Distrib. India Malay islands and China, absent from the peninsula.
- Polystachya siamensis*, Ridl. Lankawi at Burau and Kwah, (Ridley, Curtis), Pungah (Curtis).  
Distrib. Dindings.



*Luisia teretifolius*, Gaud. Perlis, Bukit Lagi (15204), Bantaphan (Keith), Punga (Curtis).

Distrib. India, Malaya, New Caledonia.

*L. brachystachys*, Bl. On trees by the river Ghirbee, (Curtis). Distrib. India.

*Adenoncos virens*, Bl. Kasum, Pungah (Curtis).

Distrib. whole peninsula to Java.

*Acampe penangiana*, Ridl. Terutau (Curtis).

Distrib. Penang.

*Stauroopsis giganteus*, Benth. Lankawi, Kwah, Terutau, (Curtis). Perlis on trees at Kanga in the ricefields (14968). Distrib. Tenasserim.

*Phaloenopsis cornu-cervi*, Par. Lankawi (Curtis), Bangtaphan (Keith).

Distrib. Burmah, Malay peninsula, Borneo, Sumatra and Java.

*Ph. esmeralda*, Rehb. fil. Lankawi (Curtis), Setul, Kotani (Ellis).

Distrib. Burmah, Cochin-China.

*Doritis wightii*, Benth. Lankawi (Curtis).

Distrib. India, Burmah, Ceylon, Malay peninsula.

*Staurochilus fasciatus*, Ridl. Terutau (Curtis). Tongka and Renong. Endemic.

*Trichoglottis tetraceras*, Ridl. Lankawi, Goa, Chirita (Curtis, 2817), Perlis, Tebing Tinggi (15224).

Flowers with ochre sepals and white lip on limestone rocks. Endemic.

*Rhynchostylis retusa*, Bl. Lankawi (Curtis).

Distrib. India, Ceylon, Java.

*Saccolabium miserum*, Ridl. Lankawi (Curtis).

Distrib. Dindings and Penang.

*S. sacculatum*, Ridl. Lankawi (Curtis, 2560 ; Ridley, 8333).  
Endemic.

*S. luisifolia*, Ridl. Lankawi, Punga (Curtis). Endemic.

*Saccolabium humile*, n. sp.

Stem 2-3 inches or more, about  $\frac{1}{8}$  inch through with a ridge or keel from the leaf base, ribbed when dry, internodes  $\frac{1}{4}$  inch long. Leaves linear, narrow, 4 inches long, nearly  $\frac{1}{4}$  inch wide, narrowed slightly at the tip which is subacute, keeled. Panicle short,  $1\frac{1}{2}$  inch long with one or two branches, slender, flowers very small, rather numerous,  $\frac{1}{10}$  inch long to tip of spur. Bracts lanceate, acute, persistent. Sepals short, ovate, rounded. Petals smaller, ovate, rounded, dull yellow. Lip white median lobe tongue-shaped, oblong, side lobes connate, meeting in the form of a ridge like callus across the entrance of the spur, spur rather long, blunt, cylindric, thick, no transverse septusa, Column rather long, anther skull shaped.

Pungah (Curtis, 3028) flowered in the Penang Botanic gardens, June, 1893.

A small species with very inconspicuous little flowers, rather remarkable for the modification of the sidelobes of the lip into a transverse ridge.

*S. setulense*, n. sp.

Stems short, about 1 inch long with copious roots. Leaves lorate, slightly curved, tip rounded, retuse, 6-7 inches long,  $\frac{3}{4}$  inch wide, keel prominent, sheath half an inch long, ribbed. Racemes several, axillary, sometimes branched, 4-6 inches long, slender. Bracts persistent, ovate, acuminate,  $\frac{1}{20}$  inch long. Flowers small, numerous, yellow. Upper sepal narrow, linear, spathulate, laterals oblong, broader, obtuse, slightly enlarged towards the tip. Petals nearly as long, narrow, spathulate, linear. Lip side lobes short, rounded, erect, midlobe papillose, ovate, fleshy, spur

scrotiform,  $1\frac{1}{8}$  inch long, calli 2, elevated fleshy ridges at the base of the midlobe, below over the spur-mouth a thin lamina toothed, an elevated ridge along the lower face of the spur inside. Column short, broad, rostellum. Anther cap skull-shaped with rather a long linear obtuse beak. Pollinia globose, pedicel linear, oblong, disc small, lanceolate. Capsule elliptic,  $\frac{1}{4}$  inch long, splitting along one side.

Setul on trees and rocks at Bukit Rajah Wang (15226), Kasum (Curtis).

Near *S. hortensis*, Ridl. but flowers smaller, all yellow leaves, narrower and longer, racemes more slender, lip papillose and a different callus.

*S. latifolium* var. *strictum*.

Stem tall, straggling. Leaves linear, narrow, 7 inches long,  $\frac{1}{2}$  inch wide, conspicuously bilobed. Panicle ascending, 1 foot long, branches ascending. Flowers as in typical *latifolium*, but the side lobes of the lip larger, oblong, quadrate, truncate.

Setul, Bukit Raja Wang (15223). The same form on the limestone rocks at Batu Caves, Selangor.

Distrib. whole peninsula and Sumatra.

*S. Scortechinii*, Ridl. Lankawi (Curtis). Distrib. Malay peninsula.

*S. secundum*, Ridl. Lankawi (Curtis).

Distrib. India, Cochin-China, Malay peninsula, Sumatra, Borneo.

*S. fissum*, Ridl. Lankawi (Curtis). Endemic.

*S. miniatum*, var. *citrinum*, Lankawi Islands (Curtis), Perlis on trees at Ginting Kabok and Kanga (14974).

Distrib. Malay islands, Java, and Philippines.

*S. bracteatum*, Ridl. (sub *sarcanthus*). Ghirbee (Curtis).

*Microsaccus brevifolius*, Sm. Kasum (Curtis).

I do not think this is anything but a form of *M. Javensis* Bl. It occurs with it in Singapore.

Distrib. Malay peninsula, Java and Burmah.

*Taeniophyllum serrula*, Hook. fil. Setul. Pungah (Curtis).

Distrib. Malay peninsula.

*Ascochilus hirtulus*, Ridl. Lankawi (Curtis).

Distrib. Malay peninsula.

*A. siamensis*, Ridl. Lankawi (Curtis), Bangtaphan (Keith).  
Endemic.

*Aerides odoratum*, Lour. Lankawi (Curtis), Perlis, Kanga and Setul.

Distrib. India, China, Cochin-China, Malay peninsula and islands. Usually near the sea.

*A. multiflorum*, Roxb. Bangtaphan (Keith), Tongka (Native collectors). Distrib. India to Tenasserim.

*Thrixspermum Arachnites*, Rehb. fil. Kasum (Curtis).

Distrib. Peninsula and islands.

*Sarcochilus suaveolens*, Hook. fil. Kopah (Fox).

A specimen of a leaf and raceme of flowers from a plant cultivated in Penang appears to be this, though the rachis is not thick and fleshy Reichenbach's figure of *S. teres* resembles it in the form of the flower allowing for bad drawing.

Distrib. Chittagong and Tenasserim.

*Acriopsis javanica*? Setul.

Out of flower.

*Podochilus lucescens*, Bl. Lankawi, Gunong Raya (Curtis), Trang, Chong (Native).

Distrib. Tenasserim to Java.

*P. cornuta*, Schlecht. Lankawi Gunong Raya (Curtis).

Distrib. India, China, Peninsula and Islands.

*P. bifaria*, Schlecht. Lankawi, Gunong Raya (Curtis).

Distrib. Tenasserim, Malay peninsula.

*Thelasis elongata*, Bl. Lankawi (Ridley), Terutau (Curtis).

Distrib. Malay peninsula.

*Vanilla griffithii*, Rehb. fil. Perlis near Ginting Kabok.

Distrib. Malay peninsula.

*V. aphylla*, Bl. Setul, on sandy heaths, Trang, etc. Distrib. Tenasserim and Java.

I believe *V. Parishii* Rehb. fil. is identical with this plant and Blume's *V. aphylla*.

*Galeola Hydra*, Rehb. fil. Bangtaphan (Keith).

Distrib. India. Tenasserim, Peninsula, Java and Sumatra.

*G. altissima*, Rehb. fil. Bangtaphan (Keith).

Distrib. Malay peninsula and islands.

*Corymbis veratrifolia*, Thouars. Lankawi, Gunong Raya (Aniff). Distrib. Trop. Africa and Asia.

*Pogonia flabelliformis*, Lindl. Kasum (Curtis), Perlis, Ginting Kabok.

Distrib. India, Malay peninsula.

*P. punctata*, Bl. Lankawi, Kwah, Terutau (Curtis). Distrib. Malay peninsula and islands.

*P. discolor*, Bl. Lontar, Kasum (Curtis). Distrib. Java.

*Lecanorchis Malaccensis*, Ridl. Kasum (Curtis), Trang, Chong (Native). Distrib. Malay peninsula and Borneo.

*Haemaria discolor*, Lindl. Setul, Bukit Rajah Wang, extremely abundant, covering the limestone rocks in a dense mass.

Distrib. Penang, Islands off the Pahang Coast, Cochin-China, Hongkong.

*Goodyera cordata*, Hook. fil. Kasum (Curtis). Specimen a little doubtful. Distrib. India to Perak.

*Hetaeria obliqua*, Bl.? Perlis, Telor Jambu, abundant, but out of flower.

*Habenaria carnea*, N. E. Br. Lankawi, Kwah, Terutau and Kasum (Curtis). Endemic.

*H. roseata*, Ridl. Trang, Setul heath, rare.

*H. glaucescens*, Ridl. Kasum, Tongka, Pulau Hujung Duri (Curtis). Endemic.

*H. acuiifera*, Lindl. Tringanu, Ismail Rantau (Down). Distrib. India, Tavoy, China.

*H. Lindleyana*, Steud. *H. columbae*, Ridl. Siam (Native collector).

*H. Susannae*, Lindl. Lankawi, Kwah (Curtis), rare. Setul (Native collectors).

Distrib. India, Burmah, China, Malay islands.

*Cypripedium niveum*, Rehb. f. Lankawi islands. Distrib. Terubilan islands.

*C. insigne*, var. *exul*, Ridl. (*C. exul*, Hort.) Renong, Tongka at Kasum (Curtis) on rocks. Endemic.

*C. bellatulum*, Pulau Ledi.

#### APOSTASIACEÆ.

*Apostasia nuda*, Br. Lankawi, Burau, Setul heaths (14975). Distrib. whole peninsula, Borneo and Sumatra.

#### SCITAMINEÆ.

*Globba panicoides*, Miq. Lankawi (Curtis.) Distrib whole peninsula and islands.

*G. calophylla*, Ridl. Kasum (Curtis). Endemic.

*Koempferia pulchra*, Ridl. Lankawi (Curtis), Kedah, Gunong Geriang on limestone rocks.

*K. elegans*, Wall. Lankawi (Curtis), Kedah, Gunong Geriang. Distrib. Pegu, Tenasserim.

*Gastrochilus luridus*, Ridl. Lankawi (Curtis). Endemic.

*G. Curtisii*, Baker. Lankawi, Limestone rocks (Curtis). Endemic.

*Gastrochilus acutus*, n. sp.

Plant with the habit of *G. Curtisii*, forming a tuft. Leaves distichous, sheaths closely marbled with red, 3 inches long, petiole 3 to 4 inches long, blade ovate, elliptic, acuminate, base broad, rounded, 10 inches long, five inches across, dark green above, ribbed, paler, sparingly hairy with white hairs beneath. Flowers in a central cone of lanceolate, acute bracts, marbled like the leaf sheaths about 2 inches long, Flowers rather small. Corolla tube cylindric, white, projecting 1 inch, lobes lanceolate, acuminate, acute, half an inch long, white, Stamino-odes about half as long, narrowly oblong, obtuse. Lip shorter than the sepals, claw short, narrow, white with two deep pink streaks, Limb half an inch across, canary yellow, obovate, crenulate at the apex which is narrowed and hortly bifid, a knee of two elevated veins on the disc. Anther white, small, connective, prolonged as long as the stigma into a retuse limb.

Setul Batu Bunga, flowered in the Singapore botanic gardens, July, 1910.

Allied to *G. Curtisii* of Lankawi differing in its more glabrous leaves, shorter staminodes and quite different lip.

*Costus speciosus*, var. *argyrophyllus*. A small weak form. Perlis, Bukit Hangat Besih. Distrib. of species Indo-Malaya.

*Hedychium Gomezianum*, Wall. Kopah, (Long in Curtis collection). Distrib. Tavoy and Tenasserim.

*Zingiber spectabile*, Griff. Perlis, woods at Ginting Kabok. Distrib. whole peninsula as far South as Malacca, and Sumatra.



*Z. Cassumunar*, Roxb. Trang (Goldham). Distrib. Indo-Malaya.

*Amomum testaceum*, Ridl. Setul, Bukit Rajah Wang, Perlis, Ginting Kabok. Distrib. Pulau Tioman and Batu Caves Selangor.

*A. uliginosum*, Koen. Raput Nok. (Koenig). Distrib. as far South as Malacca.

*Hornstedtia megalocheilus*, Ridl. Setul, Rajah Wang, woods in the limestone rocks.

Distrib. Malay peninsula.

*Elettariopsis pubescens*, Ridl. Setul, village near Bukit Rajah Wang. Distrib. Malay peninsula.

var. with larger leaves, 7 inches long, 3 inches wide, elliptic, flowers rather larger than usual. Lankawi, forests at Burau.

*Alpinia latilabris*, Ridl. Perlis, Base of Bukit Lagi and about Bukit Hangat Besih, nearly out of flower.

Distrib. Pahang East Coast.

*A. malaccensis*, Var. Bangtaphan (Keith).

*Alpinia conchigera*, Setul, Damp spots.

Distrib. Malay peninsula and Sumatra.

*Donax grandis*, Ridl. Perlis, Tebing Tinggi, Ginting Kapok.

Distrib. Tenasserim, Andamans, Malay peninsula, Sumatra, Borneo.

*D. arundastrum*, Lour. Kedah, Alor Sta, river banks, Perlis, Bukit Hangat Besih, etc. Common in tidal rivers.

*Stachyphrying Jayoranum*, Schum. Kedah, Bukit Pinang, Alor Sta, Perlis near Kanga, Setul. Distrib. Malay peninsula.

*Musa malaccensis* var. *minor*.

Stems rather slender, about 6 feet tall. Leaves long, 14 inches across, apex truncate, 2 inches across with a short terminal process. Spike pendulous, rachis glabrous. Bracts oblong, obtuse, dark maroon, brown those of the male flowers, 3 inches long, 1 inch wide. Flowers  $1\frac{1}{4}$  inch long. Corolla oblong, trifid at the tip, the small lobe half an inch long, yellowish white. Stamens, anthers linear, shorter, or as short as the flower, Style slender. Fruit in two rows, 2 inches long, cylindric, obscurely angled with very little pulp. Seeds angled.

Perlis Limestone rocks at Bukit Lagi.

This resembles a small form of *M. malaccensis*, Ridl. and I hardly like to separate it though it might possibly be specifically distinct.

## AMARYLLIDÆ.

*Hypoxis aurea*, Lour. In bamboo jungle, Bangtaphan (Keith).  
Distrib. India, Java, China, Japan, Pahang, Province Wellesley.

*Curculigo latifolia*, Dry. Not common. Woods on the heath at Setul. A form with rather elongate inflorescence.  
Distrib. Burmah, Andamans, Malaya.

*Crinum Northianum*, Bak. Kedah, Tidal ditches at Alor Sta.

This fine plant much resembles the Sarawak plant, but did not appear to be stoloniferous as it is in Borneo. The leaves were seven feet in length, the stem large and stout. The flowers as in the Borneo plant, but the Stamens were white. The fruit had the same shape and size of the Borneo plant, pointed at both ends, but more or less pear shaped, green.

*Cr. defixum*, Ker. Common, Perlis rice fields near Ginting Kabok, etc. Setul, Bangtaphan (Keith).

In dry grassy spots. Distrib. India, Ceylon, Siam  
Borneo, Malay peninsula, Kelantan, North Perak and  
Pahang East Coast.

*Eurycles amboinensis*, Bangtaphanoi (Keith). Perlis, Tebing  
Tinggi on rocks.

#### BURMANNIACEÆ.

*Burmattia gracilis*, Ridl. Terutau (Curtis). Distrib. Endemic.  
*B. coelestis*, Don. Setul, Lankawi (Curtis). Kasum (Curtis).  
Distrib. India, Labuan, Peninsula.

#### TACCACEÆ.

*Tacca viridis*, Trang (Goldham). Endemic.  
*T. pinnatifida*, Forst. Sea-shore Kwah (Curtis, Ridley, 14967).  
Distrib. Indo-Malaya, Polynesia.  
*T. vespertilio*, Ridl. Perlis, Tebing, Tinggi, Setul. Distrib.  
Malay peninsula as far South as Northern Perak.

#### DIOSCORCEAEÆ.

*Dioscorea pentaphylla*, L. Lankawi (Curtis), Distrib. Africa,  
India, Malay peninsula and islands.  
*D. glabra*, Roxb. Lankawi, Kwah (Curtis). With a narrow  
leaved form. Kedah, Alor Sta, Indo-Malaya.  
*D. Daemona*, Roxb. Lankawi (Curtis). Distrib. India, Bur-  
mah, Malaya.  
*D. sativa*, L. Lankawi (Curtis). Distrib. Indo-Malaya.

#### ROXBURGHIIACEÆ.

*Stemona tuberosa*, Lour. Perlis, common on Bukit Lagi near  
Kanga. Distrib. Siam, Cochin-China, Malay peninsula,  
Pahang East-Coast, Dindings, Penang and Kedah.

## LILIACEÆ.

*Peliosanthes violacea*, Wall. Punga (Curtis), and Perlis, Bukit Lagi, probably but in fruit only.

Distrib. India, Malay peninsula.

*P. stellaris*, Ridl. Kedah, Bukit Pinang, Alor Sta.

Distrib. Penang.

*P. Teta*, Andr. var. *angustifolia*. This plant differs from the typical Himalayan form in its narrow, lanceolate leaves, acuminate at both ends, 6 to 8 inches, 1 to  $1\frac{1}{4}$  inch wide, petiole 2 to 8 inches wide, the Indian form having elliptic, lanceolate leaves, 7 inches long,  $1\frac{1}{2}$  inches wide. The species may be distinct but the original plant is hardly sufficiently described, and I have seen no flowers of it. The plant I refer to the above name has been fully described in the Journal of the Royal Asiatic Society, Straits Branch, vol. 31, p. 93-94.

It occurs on Penang Hill; Pulau Badak, Curtis, 2938, (a rather dwarfed form) and at Tonka (received alive among orchids in 1896), and Kasum (Curtis, 3263), also Lankawi, Gunong Raya (Aniff).

*P. lurida* Ridl. Lankawi, Kwah (Curtis). Distrib. peninsula.

*P. graminea*, n. sp. A densely tufted plant with numerous grassy leaves, narrowly lanceolate, linear, erect, acuminate at the apex and gradually narrowing away into the petiole, 12 to 14 inches long and  $\frac{1}{4}$  to nearly  $\frac{1}{2}$  inch wide, thinly coriaceous, light green, petiole 6 inches long. Raceme shorter than the leaves, 6 to 9 inches long. Bracts at the base lanceolate, long, acuminate,  $1\frac{1}{2}$  inch long or less getting shorter higher up the raceme, upper floral ones lanceolate, acuminate with a broad base nearly elongate, triangular,  $\frac{1}{8}$  inch long. Flowers in pairs with a short ovate bract at the base of each. All pale green with a broad white margin, eventually becoming scarious. Peduncle cylindric, dull dark green, half as long as the bract,

Perianth  $\frac{1}{8}$  inch long,  $\frac{1}{4}$  inch across, dull bluish green on a short cylindrical light green pedicel, tube campanulate, lobes ovate, obtuse, dull green. Androecium adnate to the perianth, fleshy, annular, dull green with faint purplish streaks, running down the tube and adnate to the sides of the pistil above. Anthers small, inflexed, yellow. Ovary inferior, adnate to the walls of the tube, 2-3 elongate ovules in each cell. Style conic, short, 3 grooved. Seeds azure blue.

Tongkah, Gunong Toxai near the town of Puket, cultivated in Penang and Singapore gardens.

This plant with its fine grassy leaves and bright azure blue seeds is quite a pretty plant for cultivation. It is usually very floriferous, and I had a plant with 23 spikes of fruit on it.

There is no doubt that this is allied to *P. Teta*, var *angustifolia*, but has a shorter raceme as a rule, and the leaves are very distinct. The colouring of the flowers is different, the petals obtuse and the androecium completely adnate to the petals.

*Ophiopogon malayanus*, Ridl. Lankawi, Gunong Raya (Curtis). Distrib. Penang and Perak.

The Penang plant might be the *O. prolifera*, Lindl. described from a plant received by him from Penang and cultivated. It agrees with the description in its fleshy flowers and violet purple rachis. Lindley's plant however had entirely green leaves, and the stamens joined by a ring at the base. I have carefully examined the flower of the Penang plant, and find the stamens not connected by a ring but free to the base and the leaves are white on the back. Lindley's specimen in the Horticultural Society's collection now at Cambridge, I have been unable to find there.

*Thysanotus siamensis*, n. sp.

Leaves slender, terete, glaucous, green, 8 inches long. Stems slender, terete, glaucous, green, 10 inches long,  $\frac{1}{2}$  inch through. Flowers terminal, umbelled about 6 or 7. Bracts very small, lanceolate with white scarious margins. Pedicels half an inch long, erect, in flower pendent in fruit. Sepals green, lanceolate, oblong, obtuse with broad white scarious margins,  $\frac{1}{8}$  inch long. Petals as long, oblong, lanceolate, obtuse, blue fringed on the edge, with a whitish central bar. Stamens 6, half as long as the sepals, filaments very short, anthers twice as long, linear, oblong, obtuse, truncate. Ovary small, globose, style slender, cylindric, filiform, as long as the stamens. Capitate capsule globose,  $\frac{1}{4}$  inch long, subtended by the persistent sepals, dehiscing from the apex, seeds 2 in each loculus.

Setul, heaths behind the village, local but abundant in one or two spots (14980).

The genus *Thysanotus* is typically Australian, but one species occurs in Hongkong and the Philippines also, which differs in its foliage. The flowers open in the early morning and close very speedily, remaining open a few hours only. They open singly.

*Chlorophytum longissimum*, Ridl. Trang (Curtis). Endemic.

*Chl. orchidastrum*, Lindl. On rocks at Tebing Tinggi, Perlis, abundant, but not in flower. Distrib. India and Malay peninsula.

*Dianella ensifolia*, Red. Setul. Distrib. Mascarene islands, Indo-Malaya, Australasia.

*Asparagus racemosus*, Willd? Lankawi and Tonka (Curtis). Distrib. India. Species doubtful, no fruit or flowers.

*Dracaena siamensis*, Ridl. Perlis, sandy heath near Ginting Kabok. Endemic.

*Dr. Curtisii*, n. sp.

Leaves lanceolate, linear, acuminate gradually to a long point, narrowed gradually to the base with a strong keel, thinly coriaceous, 20-30 inches long,  $1-1\frac{1}{4}$  inch wide. Panicle 30 inches long with 3 to 5 distant branches, 4-6 inches long, base of rachis stout, woody,  $\frac{1}{4}$  inch through with several lanceolate, long, acuminate bracts, 4 inches or less long and  $\frac{1}{2}$  inch wide at the base. Flowers 5 or 6 together in short tufts with ovate, acuminate bracts,  $\frac{1}{8}$  inch long. Perianth slender, tubular,  $\frac{3}{4}$  inch long, lobes very narrow, free nearly to the base, base dilated. Stamens nearly as long as the lobes. Anthers oblong, blunt at both ends, yellow. Fruit globose, 1-2 seeded,  $\frac{1}{4}$  inch through when dry, or larger.

Lankawi, Kwah (Md. Aniff; T. A. Wooldridge) and Setul.

This seems nearest to *D. Jackiana*, Wall. but the leaves are more of the shape of *D. brachystachys*, Hook. fil. from which it differs in the much less coriaceous texture.

*Dr. cordylinoides*, Ridl. Ghirbee (Curtis). Setul, Bukit Rajah Wang. A shrubby dracaena, flowers very small, yellowish white, tube very short, drupe orange, 1 seeded,  $\frac{1}{8}$  inch long.

*Smilax Helferi*, A. Dec. Kedah, Alor Sta, Lankawi (Curtis).

Distrib. Hedges and thickets, usually in dry spots, Tenasserim, Malay peninsula.

*S. leucophylla*, Bl. Kasum (Curtis).

Distrib. Cochin-China, Malay peninsula and Islands.

#### COMMELINACEÆ.

*Polia sorzogonensis*, Endl. Lankawi islands (Md. Aniff).

Distrib. Indo-Malaya, China, New Caledonia.

*P. subumbellata*, Clarke. Stem slender for a *Pollio*, creeping and ascending 3 feet with long wiry roots, occasionally branched, leaves thin, lanceolate, acuminate at both ends with a long terminal point, 3-4 inches long, 1 inch wide, glabrous, but slightly scabrid beneath, petiole 1 inch long, sheaths remote, 1 inch long, covered with minute, short processes. Panicle lax  $1\frac{1}{2}$  inches long on a peduncle, 2 inches long with one narrow leaf on it. Branches slender,  $\frac{3}{4}$  to 1 inch long, (in fruit) horizontal, slender, pubescent. Bracts ovate, blunt, lower ones acute. Bracteoles amplexicaul, rounded. Flowers white. Sepals orbicular, glabrous. Petals thin, ovate, as long or little more. Stamens 3, perfect. Anthers elliptic, thick, filaments slender, longer than the petals, 3 abortive stamens with very small anthers. Fruit elliptic, globose, blue. Seeds numerous, irregularly angled, flattened on one side, grey, punctate.

Kedah, Gunong Geriang on limestone rocks (14836), Bangtaphan, riverside (Keith).

Absent from the peninsula. Distrib. Eastern Himalaya, Assam, etc.

Differs from Clarke's description in its stalked inflorescence and fruit hardly globose and pitted seed, but much resembles his figure.

*Commelina nudiflora*, L. Perlis, Kanga. Distrib. whole world.

*C. bengalensis*, L. Setul, Heaths. Distrib. Africa and Asia.

*C. salicifolia*, Roxb. Perlis, Kanga (14835). Distrib. India, Java.

*C. obliqua*, Ham. Perlis, Tebing Tinggi. Distrib. Indo-Malaya.

*C. sikkimensis*, C. B. Clarke. Setul, Bukit Rajah Wang. Perlis, Chupeng. Distrib. India.

*Aneilema lineolatum*, Kunth. Kedah, Gunong Geriang; Perlis, Tebing Tinggi; Lankawi, Kwah (Curtis).

Distrib. India from Sikkim to Burmah, Malay peninsula and islands.



*A. dimorphum*, Dalz. Bangtaphan (Keith), in Bamboo jungle.

Distrib. Deccan, Peninsula.

*A. sinicum*, Lindl. Setul, Heaths (14801).

Distrib. Deccan, Peninsula, Ceylon, China, Malay peninsula and islands and Africa.

*A. giganteum*, Br. Heaths and open dry pastures, Perlis near Ginting Kabok, Setul, common (14799).

Distrib. Assam, Khasiya, Tenasserim, Decan, Ceylon, Nicobars, Malay peninsula, Batu Pahat in Johore and Kedah Peak.

*A. vaginatum*, Br. Setul, heaths local, only one patch seen, Lankawi, (Curtis).

Distrib. all India, Ceylon, China, Malay peninsula.

*A. spiratum*, Br. Bangtaphan (Keith).

Distrib. India, Ceylon, Malay islands China, not in the peninsula.

*A. conspicuum*, Kunth. Kopah, (Md. Aniff).

Distrib. Assam, Malay peninsula and islands.

*Forrestia*, sp. A few plants of some species without flowers seen at Chupeng, Perlis.

*Cyanotis cristata*, Schultes. Lankawi (Curtis).

Distrib. India, Burmah, Ceylon, Malay peninsula, Africa.

*C. axillaris*, Roem and Schultes. Perlis, fields near Kanga (14802), and Ginting Kabok (14803), Bangtaphanoi (Keith).

A pretty plant with its red succulent stems and beautiful blue flowers.

Distrib. India and Ceylon, Australia, absent from the Malay peninsula.

## XYRIDEÆ.

*Xyris indica*, L. Common in old paddy fields, but almost completely withered and dry at the time of our visit.

Kedah, Alor Sta ; Perlis, near Kanga, Setul, Lankawi at Kwah, Bangtaphanoi, (Keith).

Distrib. India, Ceylon, Malay peninsula and islands.

*X. anceps*, Lam. Setul, scanty, but probably over there.

Distrib. India and Malaya.

*X. pauciflora*, Willd. Common in marshy fields, Perlis at Chupeng, near Kanga, Lankawi islands (Ridley) and Setul.

Distrib. India, all the peninsula, Archipelago, China and Australia.

## NAIADACEÆ.

*Naius graminea*, Delile. Setul.

Distrib. all warm parts of the old world.

## FLAGELLARIEÆ.

*Flagellaria indica*, L. Bangtaphan (Keith.)

Distrib. Seashores, Tropical Asia.

## PALMÆ.

*Areca triandra*, Bl. Setul, Bukit Rajah Wang.

In swampy spots at the bases of the rocks, a tufted palm with several stems about ten feet tall and an inch through, the internodes 3 to 6 inches long.

Distrib. Chittagong to Tenasserim, Andamans.

*Didymosperma Hookeriana*, Becc. Perlis, Ginting Kabok, Setul, Bukit Rajah Wang, in Woods. A variety with much narrower leaflets occurred at Bukit Rajah Wang.

Distrib. Malay peninsula.

*Arenga saccharifera*, Lal. A few plants at Tebing Tinggi in Perlis, planted.

*Caryota mitis*, Lour. Perlis, Besih Hangat and Tebing Tinggi.

Distrib. Burmah, Andamans, Cochinchina and Malay peninsula.

*Nipa fruticans*, Wurm. Kedah and Perlis in tidal rivers.

*Phoenix paludosa*, Roxb. Kedah, Tidal river near Alor Sta, Perlis near Tebing Tinggi.

Distrib. India, Siam, Andamans, and South to Prov. Wellesley and Dindings.

*Licuala spinosa*, Wurm. Kedah, Alor Sta. Lankawi, Kwah (Curtis).

Distrib. Andamans and Malay peninsula and islands.

*Corypha elata*, Roxb. A fine *Corypha*, which I believe to be *C. elata*, Roxb. of Bengal and Burmah, forms a conspicuous feature of the landscape in Kedah at Alor Sta, and Perlis, Kanga, Tebing Tinggi, etc. I did not see it in Setul. It had a stem about 60 or 80 feet tall rather smooth and straight, about a foot and a half through. I did not see the spiral traces of leaf bases figured by Griffith. The leaf bases persisted for some way down the stem from the top. The leaves were large but not as big as those of *C. umbraculifera*, rather deeply cut into narrow bifid lobes, the petiole armed to the top with short, black, tipped thorns. The fruit was globose, dull green with rather sweet orange pulp, about 1 inch through with a short stalk  $\frac{1}{2}$  inch long. We were unable to get flowers or a spadix as the trees were not climbable, but the inflorescence had the same form as that of *C. elata*, Roxb. and I presume it belongs to that species.

The occurrence of a *Corypha* here is interesting. The genus comprises two Indian and one Ceylon species. One from Borneo and one from the Moluccas and one from

the Andamans. The imperfectly described *C. martiana*, Becc. from Burmah (Mergui?) may be the same as this species.

*Livistona rupicola*, Ridl. Lankawi (Curtis.)

Distrib. Batu Caves Selangor.

*Zalacca Wallichiana*, Mart. Perlis Woods in Ginting Kabok.

Distrib. Tenasserim, Siam, Borneo, Malay peninsula  
Pahang East, Prov. Wellesley, Malacca.

*Daemonorops elongatus*, Miq. Lankawi, Kesap (Aniff), Burau bay (Ridley). "Rotan Jerni." Distrib. Malay peninsula and islands.

There is a specimen of a *Daemonorops* collected by Curtis in Kasum, but it is too incomplete to identify, and I saw a species of the *Cymbospathae* section in the forest at Ginting Kabok, Perlis.

*Calamuns arborescens*, Griff. A tufted erect palm with smooth green stems about 3 inches through. The leaves and male spadices have been described by Beccari and Griffith, I have to add the description of the female spadix and fruit. The panicles are stout, 18 inches long. Spathels one inch long, angled with the acute tips, lacerate in fruit, unarmed and smooth. There are about ten branches, 7 inches long in each spadix. Spathellules cup shaped, acute, broad,  $\frac{1}{4}$  inch long. Calyx in fruit split not reflexed, the lobes triangular, acute, not pedicellate. Petals as long, but more narrow. The fruit resembles that of *C. erectus*, Roxb. somewhat cylindric, oblong, beaked with persistent stigmas, brown, shining, scales in 5 rows, ovate, rhomboid, obtuse, channelled with a thin, white, lacerate edge; whole fruit  $\frac{3}{4}$  inch long. Seed oblong, flattened,  $\frac{3}{8}$  inch long (not quite ripe) albumen ruminata.

Perlis, Telor Jambu; Setul, Bukit Rajah Wang, in wet muddy places. Lankawi, Gunong Raya (Aniff).  
Distribution Pegu.

A very unrattan-like plant, so much so that my Malay plant-collector took it for a *Bactris* before we found the inflorescence. It is abominably armed with sharp spines, and we found it most troublesome to get through the clumps of it.

- C. siamensis*, Becc. A low bushy rattan hardly rising more than six feet tall in open country, in Kedah near Bukit Pinang, Alor Sta, Perlis near Kanga and Setul. The commonest rattan here. The leaves are bright green with numerous narrow pinnae close together, armed on the back of the rachis with pale yellowish spines,  $1\frac{1}{2}$  inch long, needle-like and straight. The male spadix is about two feet long, the lowest sheath flattened, scurfy, armed with straight, horizontal spines,  $\frac{1}{4}$  inch long, the stem above this is armed with short, thick hooks, 1 to 4 together with a thick base, the upper sheaths less armed. There are four sheaths and as many panicles and the spadix ends in a whip (flagellum) 2 feet long, slender with pairs of short bull's horn shaped hooks. The panicles are 3 or 4 inches long. Secondary spathes unarmed dilated upwards, smooth with a round mouth and an ovate, acute limb. The branches are  $1\frac{1}{2}$  to 2 inches long, densely crowded with flowers, which are in twos or threes in short cup shaped, acute spathellules,  $\frac{1}{10}$  inch long. The calyx lobes are rather long, lanceate, acute. Petals lanceolate, nearly half as long again, acute. The female spadix is figured by Beccari who points out that it is peculiar in having the female flowers in pairs, but as his figure shows and as is shown too by my fruiting specimens, many of the flowers are solitary, though pairs do occur. The spadix branches are about 7 feet in length. The fruit is globose,  $\frac{1}{4}$  inch through, creamy white in colour, the scales in about 6 rows, smooth, polished, as broad as long and obtuse with a small light brown tip. Seed orbicular, very rugose, flattened,  $\frac{1}{4}$  inch long,  $\frac{1}{8}$  inch thick, the albumen is not ruminant. It has only previously been collected in Bangkok.

- C. pencillatus*, Roxb. var *purpurascens*. Lankawi, Gunong Raya, up to 2500 feet (Aniff). Distrib. Malay peninsula and islands.
- C. concinnus*, Mart. Setul, Bukit Rajah Wang In male flower. Distrib. Tenasserim and Mergui.
- C. myrianthus*, Becc. Kasum (Curtis, 3248). Bangtaphan (Keith).

A climbing rattan 30 feet in length, stem densely covered with flat brown thorns of all sizes to an inch long abruptly up-curved at base, thorns at the sheath-mouth, needle-like, 2 inches long, rachis with very long thorns. Spathes thin and papery, 6 inches long, half an inch wide. The plant is much like *C. ramosissimus*, Griffith, but the leaves are whitish beneath and the flowers smaller.

Originally described from poor specimens collected by Helfer in Mergui.

#### PANDANEÆ.

- Pandanus fuscicularis*, Lam. Between Jutra and Kanga, Perlis, Lankawi islands (Curtis).
- P. oratus*, Kurz. Perlis, Ginting Kabok and Setul on the heath.

The plant is rather different from the simple prostrate stemmed one of the Province Wellesley woods, forming low but large tufts and looking more like a dwarf *P. collinus*. The syncarps too are smaller than normal. Distrib. Malay peninsula.

#### AROIDEÆ.

- Arisaema Roxburghii*, Kunth. Lankawi islands (Curtis).

Distrib. Malay peninsula, Penang, Perak, Selangor and Java.

*A. fimbriatum*, Masters. Lankawi islands on limestone rocks.

Distrib. also Kota Glanggi, Limestone rocks, Pahang.

*A. Bakeri*, Hort. Kasum (Curtis) Endemic.

*Typhonium trilobatum*, Schott. Perlis near Bukit Lagi, Kanga.

Distrib. Upper Laos, (Micholitz) Pahang at Pekan, India.

*T. fultum*, Ridl. Lankawi (Curtis).

Distrib. Limestone rocks Batu Caves (Selangor).

*T. cuspidatum* var. *angustissimum*.

Petiole slender, 6 inches long, blade trifid with very narrow linear lobes, central one erect, 5 to 6 inches long,  $\frac{1}{2}$  inch wide at the base, laterals horizontal, one inch long,  $\frac{1}{8}$  inch wide. Inflorescence as in type.

Perlis near Bukit Lagi, Kanga, Bangtaphan (Keith).

This plant is certainly very variable in leaf. The ordinary form has broad lobes, 4 inches long and 1 to 1 $\frac{1}{2}$  inch wide, ovate or triangular, occasionally nearly entire. This variety however has extraordinarily narrow lobes and seems peculiar to this region, for I have not seen the typical form from here.

*Amorphophallus rex*, Prain. Perlis near Bukit Hangat Besih. In flower in a pasture.

Not previously recorded from the Malay peninsula, though I am certain I have seen the foliage and it has often flowered in the Botanic Gardens from tubers obtained probably in the Peninsula. Distrib. Andamans and Java.

*A. haematospadix*, Hook. fil. Terutau, Lankawi (Curtis). Perlis, Bukit Hangat Besih (Kanga). Endemic.

On limestone rocks. The spathe is nearly pure ivory white with a pinkish base and usually pinkish back; the spadix deep purple, almost black.

*A. variabilis*, Bl. Terutau (Curtis).

Distrib. Perak, Java and Borneo, Sarawak.

*A. carnea*, Ridl. This was originally described from the drawing of an inflorescence of a plant flowered in the Penang botanic gardens and brought from the Lankawi islands by Curtis. I found it very abundant on the limestone rocks, where a few decayed leaves rested, in Perlis on Bukit Lagi and Setul, on Bukit Rajah Wang. It is a small sized species with a tuber rounded and flat topped about 2 inches across. The petiole of the leaf is about 14 or 15 inches tall, and half an inch through at the base, smooth and of a dirty white color with dull Indian red longitudinal blotches; there are two long close fitting sheaths at the base. The blade has 3 branches, and is about 6 or 8 inches across, the leaflets are thin, light green, lanceolate, ending on a long point, the largest one  $5\frac{1}{2}$  inches long, and  $1\frac{1}{2}$ - $1\frac{3}{4}$  inch wide, the margins undulate, the nerves meet in loops distant from the margin, the petiolul short, are winged nearly to the base.

*Hapaline Brownei*, Hook. fil. Kedah, Gunong Geriang; Terutau (Curtis). Endemic.

*Colocasia gigantea*, Hook. fil. Limestone rocks, Perlis, Tebing Tinggi. Distrib. Malaya.

*Alocasia denudata*, Engl. The form *A. Curtisii*, Hemsley, Lankawi islands (Curtis), Kedah, Gunong Geriang.

Distrib. Malaya.

*A. Lowii*, Hook. fil. Limestone rocks, Perlis, Bukit Telor Jambu near Kanga.

Distrib. Malay peninsula and Java.

*Aglaonema costatum*, N. E. Br. Lankawi, Kwah near limestone rocks.

Distrib. Upper Siam, Laos.

*A. schottianum*, Miq. Lankawi (Curtis), Perlis, Bukit Lagi near Kanga and Telor Jambu. Distrib. Burmah, Malaya.



*A. oblongifolium*, Schott. Kedah, Gunong Geriang, occurs all through the Malay peninsula and in Borneo.

*Anadendrum montanum*, Schott. Lankawi islands (Ridley).

Distrib. Tenasserim, Malay peninsula and Borneo.

*Raphidophora minor*, Hook. fil. Setul on trees in a muddy swamp by Bukit Rajah Wang.

A tidal stream plant. Distributed over the whole peninsula and Borneo.

*R. falcata*, Ridl. Bangtaphan (Keith). Endemic.

*R. gigantea*, Ridl. (*Epipremnum giganteum*, Schott), Perlis, abundant on limestone rocks at Tebing Tinggi and elsewhere. Distrib. all the Malay peninsula.

*R. Hugeliana*, Schott. Kedah, Gunong Geriang.

Distrib. whole peninsula and Malay islands.

*Lasia aculeata*, Lour. Common in tidal mud and in inland-swamps.

Perlis, Bukit Telor Jambu. Distrib. India Burma, Cochin China, Malay peninsula and Islands.

*Pothos scandens*, L. Kedah, Trees by the road side, Bukit Pinang, Alor Sta, Perlis Telor Jambu.

Distrib. India, Malay peninsula and islands.

#### CYPERACEÆ.

*Kyllinga monocephala*, Rottb. Clearings, Bangtaphan (Keith).

*Pycnus polystachyus*, var. *laxiflorus*.

The short form with red spikeltes, Setul and Perlis at Kanga. Distrib. all warm parts of the world.

*P. punctulatus*, Nees. Kedah, Alor Sta.

Distrib. India, Malay peninsula, China.

*Cyperus haspan*, L. Kedah, Alor Sta, Setul (14834), (14830. 14831). Common, both the dwarf form of dryer spots and the elongate, much branched form of wet swamps. Distrib. Cosmopolitan.

*C. pulcherrimus*, Willd. Old paddy fields, Perlis, Kanga (14825), Bangtaphan (Keith).

Distrib. Indo-Malaya.

*C. diffusus*, Vahl. Kedah, Alor Sta, (14832).

Distrib. Cosmopolitan.

*C. bancanus*, Miq. Setul Heaths (14833), Bangtaphan sea shore (Keith). Distrib. Assam, Burma, Malaya.

*C. Iria*, L. Perlis at Kanga, Cosmopolitan.

*C. stoloniferus*, Retz. Lankawi shore (Curtis).

Distrib. Eastern Tropics.

*C. rotundus*, L. Perlis at Kanga, Cosmopolitan.

*C. malaccensis*, Lour. Common. Kedah, Alor Sta (14827). Perlis, Kanga (14828), Lankawi, Kwala Malacca (Curtis). Setul, very common in swamps.

Distrib. Tropics, Asia.

*Mariscus dregeanus*, Keith. Lankawi, Kwah (14813), sandy heaths, Setul, (14812), Bangtaphan (Keith).

In sandy spots usually near the sea.

Distrib. Africa, Indo-Malaya.

*M. sieberianus*, Nees. var. *evolution*, Perlis, fields near Bukit Lagi, Kanga (14826).

Distrib. Africa, to Polynesia.

*M. cyperinus*, Vahl. Setul Heaths (14811), Bangtaphan by Klong Thong river (Keith).

Distrib. Tropical Asia and Polynesia.

*M. microcephalus*, Presl. Perlis near Kanga. Distrib. Malaya,

*M. albescens*, Gaud. Perlis, Tebing Tinggi. Distrib. Old world tropics.

*Eleocharis equisetina*, Presl. The commonest species, Perlis, Kanga (14810), Setul, covering a great area of swamp lying between Bukit Terjonkong and Bukit Rajah Wang to the exclusion of almost everything else (14809).

Distrib. not at all common in the peninsula, only met with in Penang, occurring also in Ceylon, the Philippines and New Caledonia.

*E. fistulosa*, Lankawi, Kwala Kwah (Aniff).

*Bulbostylis barbata*, Keith. Setul, common on the heaths, Cosmopolitan.

*Scirpus erectus*, Poir. Kedah, Alor Sta (14813), Cosmopolitan.

*Sc. grossus*, Roxb. Perlis at Kanga.

*Sc. mucronatus*, L. Swamps, Setul. Old world.

*Fimbristylis acuminata*, Vahl. Ricefields, Kedah, Alor Sta (14818). Distrib. Trop. Asia.

*F. spathacea*, Vahl. Lankawi, shores of Burau bay.

*F. asperrima*, Boeck. Perlis Woods, Ginting Kabok (14841). Distrib. Indo-Malaya.

*F. miliacea*, Vahl. Setul (14821) Distrib. Tropics, Kedah, Alor Sta (14875).

*F. leptoclada*, Benth. Heaths Setul (14819). Distrib. Ceylon, China, Malay Peninsula and Borneo.

*F. longispica*, Steud. Heaths Setul (14820). Distrib. Pahang East Coast, China and Japan.

*F. podocarpa*, Nees. A rather stiff, wiry sedge, about 2 feet tall, tufted with a short rhizome, sheaths purple. Leaves narrow, linear, obtuse, stiff, 4 inches long,  $\frac{1}{10}$  inch wide, scape terete, cyme about 1 inch, 5 to 12 spikelets, about  $\frac{1}{2}$  an inch long, cone shaped. Glumes ovate, minutely mucronulate, hardly keeled, pale edged with yellowish brown. Style bifid, flat edge, ciliate. Nut orbicular,

obovoid, flattened, smooth, margined, top truncate, borne on a short red, cylindric gynophore, dilated above, pale straw color, not striate.

Kedah, paddy fields, Alor Sta (14876), Setul (14878), Perlis, Kang (14879).

*F. (Abilgaardia) angustifolia*, n. sp. A densely tufted plant with numerous fibrous roots. Leaves setaceous, linear, numerous, 4-5 inches long,  $\frac{1}{20}$  inch wide, quite glabrous. Callus slender, 6 to 10 inches long with slender spreading branches, 1 inch long, bracts linear, acuminate. Spikelets narrow,  $\frac{1}{4}$  inch long or less, lanceolate, acute. Glumes lowest, empty ones ovate, acute, distichous, upper ones subdistichous, lanceolate, mucronate, keeled with an elevated rib on each side of the keel, reddish brown, edges paler, slightly scurfy. Nut white, obovoid with a rounded tip, slightly 3 angled, minutely pustular with no ribs. Style red dilated at the base.

Setul, sandy places on the heath (14822), Labuan (Ridley 9042 : Bp. Hose).

*F. rigidifolia*, n. sp.

Stem short and thick, densely covered with broad leaf sheaths. Leaves stiff, linear, rigid, obtuse, margins denticulate, 1-3 inches long,  $\frac{1}{8}$  inch wide, light green, recurved. Culm slender, 12-16 inches long, moderately stout, grooved, branches numerous, spreading, primary branches 1-3 inches long, spikelets lanceolate,  $\frac{3}{8}$  inch long, narrow. All glumes lanceolate, subdistichous, brown, acuminate, hardly keeled, entirely scurfy. Nut none ripe seen, triquetrous, obovoid, style hardly dilate at the base.

Setul on heaths, (14877).

Of the species of *Fimbristylis* belonging to the section *Abilgaardia*, there are several of the *fusca* group, which might possibly be connected into one species of an extremely polymorphic nature. What appears to be the

true *F. fusca* Benth. occurs on the top of Government hill, Penang and I met with it also in an estate in Holland road, Singapore; a tall slender plant with short flaccid grass-like leaves. I have also a specimen from Java from Horsfield's collection which has the same tall habit, a more spreading panicle, but with rigid, obtuse leaves. The two above described are much smaller plants. *F. angustifolia* with narrow, wiry leaves, nearly terete and *F. rigidifolia* with somewhat similar, inflorescence, but short, broad, stiff leaves.

*F. (Abilgaardia) monostachya*, Perlis near Kanga (14823).

*Euirena glomerata*, Lam. Kedah, Paddy fields, Alor Sta, Lankawi (Ridley).

Distrib. Province Wellesley and Perak, absent from the south of the peninsula, occurs in most of the old world tropics. The absence of *F. umbellata* Rottb. the common southern species was very marked.

*Rhynchospora aurea*, Vahl. Common, Kedah, Alor Sta; Perlis, Kanga; Setul heaths.

A small weak form with reduced panicle in fields at Kanga. Cosmopolitan.

*Rh. Wallichiana*, Kunth. Setul Heaths (14814, 14815).

Distrib. Tropics of old world.

*Rh. glauca*, Vahl. Perlis at Kanga. Setul heaths (14816).

Distrib. Cosmopolitan.

*Cladium undulatum*, Thw. Setul on heaths, very abundant at one spot forming great tussocks close together (14824).

Distrib. Ceylon, Labuan, Borneo, Sumatra, Australia, Pahang.

*Pennisetum maritima*, Aubl. Lankawi sea shores. Cosmopolitan.

*Manisuris tenuiscapa*, Clarke. Kedah, Bukit Pinang near Alor Sta (14817), Lankawi, Burau.

A curious locality for this plant usually an inhabitant of tidal mud.

Distrib. Johor, Sumatra and Borneo.

*Scirpodendron costatum*, Kurz. Common in tidal swamps, Setul. Distrib. Ceylon, Malaya, Australia.

*Scleria lithosperma*, Willd. Setul, Bukit Rajah Wang (14805). Tropics generally.

*Scl. oryzoides*, Presl. Very common, Kedah ricefields near Bukit Pinang, Perlis, Kanga (14803).

Distrib. Indo-Malaya.

*Scl. caricina*, Benth. Heaths Setul (14806).

Distrib. Indo-Malaya, Australia.

*Scl. bancana*, Miq. var *nana*. A curious dwarf variety with stems about 2 feet tall, and short reddish compact panicles, forming tussocks. Heaths Setul (14804).

*Scl. hebecarpa*, Nees. Heaths, Setul (14807). Distrib. Tropical Asia and Australasia.

*Carex indica*, L. Extremely abundant, especially on Bukit Pinang near Alor Sta, Kedah, densely covering the ground. Also Perlis heaths near Ginting Kabok, and Setul (14808) Trang (Kunstler), Lankawi, Sungei Batu Asap (Aniff) and, Burau. Distrib. India, Cochinchina and Java.

*C. malaccensis*, Clarke. Lankawi, Kwala Malacca and Ayer Panas (Curtis), Bangtaphan in Bamboo Jungle (Keith). Endemic.

#### GRAMINEÆ.

*Paspalum scrobiculatum*, L. Setul. Cosmopolitan.

*P. conjugatum*, Berg. Pelis, Kanga. Cosmopolitan.

*P. distichum*, L. Perlis, Tebing Tinggi, Tidal mud. Cosmopolitan.

*P. parviflorum*, var. A compact dwarf plant, four inches tall, forming tufts, leaves short, very hairy, rachis flexuous, spikelets rather obtuse, elliptic.

Setul, Sandy heaths (14866), allied forms with pilose hairy leaves occur in Singapore.

*P. sanguinale*, Lam. Perlis, Kanga, etc. Cosmopolitan.

*Eriochloa annulata*, H. B. K. Perlis, Kanga (14868.) Cosmopolitan.

*Isachne Kunthiana*, Wt. Lankawi (Curtis). Form with very bristly outer glumes.

Distrib. Indo-Malaya.

*I. miliacea*, Roth. Perlis, Bukit Hangat Besih (14871).

Distrib. Indo-Malaya, Australia.

*I. rigida*, Nees. Setul, abundant on the heaths in considerable masses (14874).

Distrib. Tenasserim, Nicobars, Java, Borneo, China, absent from the peninsula.

*Panicum crus-galli*, L. Perlis fields, Kanga. Cosmopolitan.

*P. colonum*, L. Perlis, Kanga. Cosmopolitan.

*P. repens*, L. Setul. Cosmopolitan.

*P. indicum*, L. Setul. Cosmopolitan.

*P. auritum*, Presl. Setul, Rajah Wang, swamps, (14872).

Distrib. Indo-Malaya.

*P. latifolium*, Sw. Lankawi, Burau (Ridley).

*P. luzonense*, Persl. Perlis, Kanga, Field paths near Bukit Lagi (14867). Distrib. Indo-Malaya.

*P. nodosum*, Presl. Perlis, Kanga.

*P. antidotale*, Roxb. Setul heaths (14865). Absent from the peninsula. India, Ceylon, Africa, Australia.

*P. sarmentosum*, Roxb. Setul, Trang at Chong (Native). A form with short, broad, lanceolate leaves, broad based,  $1\frac{1}{2}$

inch across, occurred abundantly in the low country at Chupeng, forming impenetrable masses 7 or 8 feet tall (14870). Distrib. Indo-Malaya.

*P. pilipes*, Nees. Perlis, Chupeng. Distrib. Mascarenes, Indo-Malaya, Australia.

*Setaria glauca*, Beauv. Setul Heaths (14873).

Here many of the spikes were pale whitish green and not orange tawny as in the ordinary plant. Cosmopolitan.

*Oplismenus compositus*, Beauv. Common on the limestone rocks, Kedah, Alor Sta, Perlis, Tebing Tinggi. Cosmopolitan.

*Thuarea sarmentosa*, Pers. Lankawi, Kwah sea shore (14854) Distrib. Madagascar, Ceylon, Nicobar, Malaya, to Polynesia.

*Oryza latifolia*, Desv. Kedah, base of Gunong Geriang. Distrib. Malay peninsula.

*Perotis latifolia*, Ait. Lankawi sea shores (14855). Distrib. Tropics of old world.

*Dimeria Kurzii*, Hook. fil. Setul Heaths (14880). I have seen no specimen of this plant from the original habitat Burmah, but I think this is the plant intended. It has very much the habit of *D. ornithopoda*, but the spikes are solitary; the rachis bears white silky hairs and I see no awn to the second glume, otherwise it fits the description of *D. pusilla*, Thw.

*D. fuscescens*, Trin. Perlis at Kanga (14881), (14882), and a variety with broader, very hairy leaves at Setul. Common in fields and sandy heaths, a beautiful grass with its long purple spikes.

Distrib. India, Tenasserim.

*D. ornithopodioides*, Trin. Lankawi, Kwah (Aniff).

Distrib. Malay peninsula.



*Imperata arundinacea*, Cyrillo. Common, Kedah, Alor Sta, Perlis and Setul, coming up on the burnt heath. Cosmopolitan.

*Eremochloa Malayana*, Ridl. Setul (14846) on Heaths, only other locality known at Yan in Kedah.

*Rottboellia cancellata* n. sp.

Tufted rhizome a little swollen at the base. Leaves linear, acuminate,  $\frac{1}{4}$  inch wide, glabrous except the young sheaths, especially on the margin and ligule hairy. Spikes solitary on slender peduncles,  $1\frac{1}{2}$  inch long, they are slender over an inch in length. Internodes  $\frac{1}{10}$  inch long, excavate, hollowed at the top, glabrous, spikelets 2, fertile, I as long as the internode, outer glume cartilaginous, coriaceous, ovate, subacute, cancellate all over, not winged. Glume II ovate, acute, slightly shorter. Glume III very thin, hyaline oblong. Stamens 3, deep purple. Stigmas purple, plumed. Stalked spikelet, pedicel angled as long as the internode, glumes 3 (two outer ones connate) lanceolate, subacute, outer one bifid.

Setul Heaths (15231).

Much the habit of *Mnesithea gemina* Hack. but with solitary sessile spikelets. The outer glume is cancellate all over with short processes below each cancellation.

*Mnesithea gemina*, Hack. Setul Heaths (15229). Distrib. Pahang East Coast.

*Ischaemum magnum*, Rendle. Perlis, Kanga (14840). Distrib. Malay peninsula.

*I. aristatum* L. Perlis, at Bukit Hangat Besih near Kanga (14839).

*I. muticum*, L. Baŋtaphan (Keith), Perlis, Kanga, etc. Distrib. Eastern Tropics.

*I. ciliare*, Retz. Kedah, Alor Sta (14842), Setul. Distrib. Indo-Malaya.

*I. timorense*, Kunth. Setul. Distrib. Indo-Malaya.

*Pollinia grata*, Hack. Perlis at Tebing Tinggi (14843).  
Distrib. Indo-Malaya.

*Apluda varia*, var. *aristata*. Kedah, Foot of Bukit Pinang near Alor Sta, (14847).

Rare in the peninsula, I have only met with it on the Pahang river.

*Andropogon intermedius*, Br. Perlis, roadsides and open grassy country at Kanga (14844).

Not common in the peninsula. Distrib. Indo-Malaya Polynesia.

*A. Wightianus*, Stend. Setul (14844) Heaths, Bangtaphan on the beach (Keith).

Distrib. India and Annam, occurs at Pekan in Pahang.

*A. aciculatus*, Retz. Setul. Distrib. Tropical Asia, and Australia.

*Anthistiria gigantea*, Cav. Perlis, var. *villosa*, Setul (14845).  
Distrib. Indo-Malaya, China, Australasia.

*Aristida ascensionis*, L. Setul, (14356), common on heaths, about four feet tall, absent from the peninsula. Distrib. most warm countries.

*Eriachne pallescens*, Br. Setul Heaths (14857). Abundant.

*Eleusineindica*, Gaert. Setul. Cosmopolitan.

*E. aegyptiaca*, Desf. Setul.

*Leptochloa chinensis*, Nees. Setul, in a well mouth (14862).

Distrib. India, Malaya, China, Australia.

*L. filiformis*, R. & S. Kedah, Alor Sta (14863), Perlis, Kanga (14864). Distrib. Africa, India, Burma, America. Absent from the peninsula.

*Phragmites karka*, Trin. Perlis near Bukit Lagi, Kanga (14859), Setul, abundant, Bukit Bunga and near the village (14860), Puket (Curtis). Distrib. Africa, Asia, Australia.

*Neyraudia madagascariensis*, Hook. fil. Lankawi, Kedah, Gunong Geriang (14861), Tongka near Puket (Curtis).

Distrib. Trop. Africa and Asia.

*Eragrostis viscosa*, Trin. Setul, sandy roadsides.

Distrib. Tropic. Africa and India, Malay peninsula.

*E. interrupta*, var. *diplachnoides*, Bangtaphan, edges of rice-fields (Keith), Setul, Batu Bunga (14853), Rare in the peninsula, only previously seen at Pekan. Distrib. Africa and India.

*E. amabilis*, Wd. Kedah, Alor Sta (14851).

Distrib. Trop. Asia.

*E. elongata*, Jacq. Lankawi, Kwah; Setul heaths common 14850. Distrib. Trop. Asia and Australia.

*E. elegantula*, Stend. Setul, common (14849), Kedah, Alor Sta (14848). Distrib. India, Malay peninsula.

*Lophatherum Lehmanni*, Nees. Trang at Chong, (Native collector). Distrib. Tropic. Asia.

*Centotheca lappacea*, Beauv. Perlis, Tebing Tinggi, etc.

Distrib. Africa, Indo-Malaya, Australasia.

*Gigantochloa Kurzii*, Gamble. Kasum (Curtis).

Distrib. Tenasserim, Malay peninsula.

*Bambusa spinosa*, Bl. Kedah, Alor Sta, Perlis, Kanga.

The only cultivated bamboo here. It seems to do well on dry sandy country where the other common bamboos fail. Also seen at Pekan in the same kind of ground.

*Schizostachyum chilianthum*, Munro. Kasum (Curtis, 3236).

Distrib. India, Malay peninsula.

*Oxytenanthera nigrociliata*, Munro. Kedah, Alor Sta, Perlis, Kanga and Setul (14837, 14838).

Very abundant on the Setul heaths forming dense thickets, undoubtedly wild in this district. Distrib. India, Andamans, Malay peninsula, Sumatra, Java.

## FERNS.

*Alsophila contaminans*, Sw. Lankawi, Gunong Raya at 1500 feet (Aniff). Distrib. Malaya.

*Humata pedata*, Sw. Lankawi (Curtis).

*Davallia solida*, Sw. Lankawi, Gunong Raya at 1500 feet (Aniff).

*Microlepia speluncæ*, L. Kedah, Gunong Geriang, Lankawi (Fox).

*Lindsaya cultrata*, Sw. Lankawi (Curtis).

*Trichomanes maximum*, Bl. Lankawi, Gunong Raya at 2000 feet (Aniff).

*Tr. Javanicum*, Bl. Lankawi, Burau, Telaya Tujoh.

*Adiantum lunulatum*, Burm. Lankawi (Fox), Setul, Bukit Rajah wang.

*A. caudatum*, L. Limestone rocks, very common, Kedah, Gunong Geriang; Perlis, Bukit Lagi and Bukit Besih Hangat, Setul; Bukit Bunga.

*A. gomphophyllum*, Bak. Pungah, Rocks near the village (Curtis). Endemic.

*A. capillus-veneris*, L. Lankawi, on dry rocks in Burau bay.

*Cheilanthes tenuifolia*, Sw. Lankawi, Burau, Setul. Perlis, Tebing Tinggi, Kasum (Curtis).

*Pteris cretica*, L. Lankawi, Gunong Rayah (Curtis) and Burau, track to Prigi Tujoh (Ridley).

*Pt. patens*, Hook. Lankawi, Foot of Gunong Raya (Fox).

*Pt. quadriaurita*, Retz. Kedah, Gunong Geriang (14753).

*Campteria biaurita*, L. Lankawi, Burau.

*Doryopteris ludens*, Wall. Perlis, Bukit Lagi, Setul (14760).

*Ceratopteris thalictroides*, L. Lankawi (Curtis).

*Blechnum serratum*, Rich. Setul.

*Thamnopteris nidus-avis*, L. Not common. In damp spots in the shadow of rocks. This plant cannot stand continued dry and hot weather for any length of time, so can only persist where the surroundings are permanently damp. Perlis, Bukit Lagi near Kanga: Setul, Rajah Wang.

*Asplenium longissimum*, Bl. Rocks, Perlis, Bukit Hangat Besih; Setul, Bukit Rajah Wang.

*A. falcatum*, Lam. Setul, Bukit Rajah Wang; Perlis, Bukit Lagi (14752), Lankawi (Aniff).

*A. caudatum*, Forst. Very common on limestone rocks, Kedah, Gunong Geriang; Perlis, Bukit Lagi; Tebing Tinggi; Kasum (Curtis).

*Anisogonium esculentum*, Sw. Wet muddy swampy spots beneath the rocks, Setul, Bukit Rajah Wang (14759).

*Aspidium variolosum*, Wall. Perlis, Tebing Tinggi (14757).

*Lastrea symmatica*, Willd. Lankawi, Foot of Gunong Raya (Curtis).

*L. chupengensis*, Hook. Perlis, mouth of a cave in Chupeng (14769). Endemic. Allied to *L. Parishii*. Bedd. of Moulmein.

A charming little dwarf fern only, 2 to 5 inches tall. I am not sure if Colonel Beddome actually published a description of this plant before his death which occurred this year. I give a short description of it. Caudex creeping, glabrous, stipes  $1\frac{1}{2}$  to 2 inches long, pale green, slender, glabrous, fronds rather narrow,  $1\frac{1}{2}$  inch across at the base, about 3 inches long, the lower pinnae the largest about an inch long or less, cut down half way to the rachis, lobes oblong, rounded, and often bilobed or trilobed at the tip, thinly membranous, light green, rachis covered beneath with scattered white hairs, upper surface scantily hairy. Veins forked in the lobes, Sori reniform, very small, apical on a short veinlet, well below the apex, much like those of *L. Parishii*. A smaller less deeply cut plant than *Parishii* with narrower fronds.

*Nephrodium pteroides*, Retz. Lankawi, Kedah, Alor Sta (14764).

*N. unitum*, L. Setul (14765).

*N. urophyllum*, Wall. Lankawi, Gunong Raya (Curtis).

*Nephrolepis volubilis*, Sw. Lankawi, Kwah (Curtis).

*Oleandra neriiformis*, Cav. Lankawi (Curtis), on Gunong Raya (Aniff).

*Goniophlebium verrucosum*, Wall. Lankawi (Curtis).

*G. subauriculatum*, Bl. Lankawi (Curtis).

*Niphobolus adnascens*, Sw. Setul, Lankawi at Burau.

*N. penangianus*, Hook. Perlis Rocks at Kanga.

*N. acrostichoides*, Sw. Lankawi, Burau.

*Drynaria rigidula*, Sw. Setul (14754).

As far South as the Semangkok pass.

*Dr. quercifolium*. Perlis, common on the ridges of Bukit Lagi, Perlis.

*Pleopeltis phymatodes*, L. Lankawi (Curtis).

*P. irioides*. Setul (15193).

*Antrophyum reticulatum*, Kaulf. Rocks, Bukit Rajah Wang, Setul.

*Toenitis blechnoides*, Sw. Lankawi, Burau woods.

*Vittaria elongata*, Sw. Setul.

*V. scolopendrina*, Presl. Lankawi, Gunong Rayah (Curtis).

*V. lineata*, Sw. Kasum (Curtis, 3271).

*Hemionitis arifolia*, Burm. Setul, near Bukit Bunga. In dry village orchards (14756).

*Stenochlaena palustre*, L. Setul. Perlis, Chupeng.

*S. sorbifolia*, L. Pungah (Curtis).

*Polybotrya appendiculata*, Willd. Lankawi (Curtis).

- Gymnopteris flagellifera*, Wall. Setul, muddy spots at the base of Bukit Rajah Wang.
- Acrostichum aureum*, L. Very abundant. Kedah, Alor Sta; Perlis, Tebing Tinggi, Setul, along the bases of the hills.
- Platyцерium grande*, Sw. Setul, on trees (14798), Lankawi near Kwah (Curtis.)
- Pl. biforme*, Bl. Lankawi, Burau bay.
- Schizæa dichotoma*, Sw. Trang, Chong, (Native), Singgora (St. V. B. Down).
- Lygodium circinatum*, Sw. Lankawi (Curtis).
- L. polystachyum*, Wall. Kedah, Bukit Pinang near Alor Sta (14751), Tongkah, common (Curtis).
- Ophioglossum pendulum*, L. Perlis, Bukit Lagi near Kanga.

LYCOPODIACEÆ.

- Selaginella semicordata*, Lankawi, Sandy woods (Ridley, 8322) and Gunong Raya (Aniff).
- S. suberosa*, Spr. Kedah, Gunong Geriang (14775) and Perlis at Kanga.
- S. caulescens*, Spr. Bangtaphan river side (Keith).
- S. flabellata*, Spr. Lankawi, Telaya Tujoh, on rocks in the stream.

CHARACEÆ.

- Chara flaccida* var. *brevibracteata*, Lankawi, Dayong Bonting lake. "The bottom must be a perfect cushion of this" (Curtis, 2587).

ADDENDA.

- Dipterocarpus alatus*, Roxb. Bangtaphanoi (Keith).
- D. cornutus*, Dyer. Lankawi, Burau. Fruits picked up.

NOTE--Wherever no collector's name is given, the plants were collected by myself.